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HYDRAULIC CHARACTERISTICS OF RIGOLETS PASS, LOUISIANA, HURRICANE SURGE CONTROL STRUCTURES

Hydraulic Model Investigation

by

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The Rigolets model was a fixed-bed model constructed to undistorted linear scale ratios of 1:100 horizontally and 1:100 vertically. The region reproduced by the model is 3.2 miles of the Rigolets, starting at the Lake Pontchartrain entrance of the Rigolets. The model was equipped with the necessary appurtenances for reproduction of steady-state flow in both ebb and flood directions and accurate measurement of water-surface elevations and currents under this condition. Verification tests were conducted to make certain that
(Continued)

20. ABSTRACT (Continued).

the model hydraulic regimen agreed with that of the prototype. The agreement attained between water-surface elevations and current velocities from similar model and prototype conditions was considered satisfactory. The testing program consisted of water-surface elevations, current velocities, and surface current patterns for various control structure plans. Plan 1 tested in the Rigolets model is identical to the plan that was tested in the Lake Pontchartrain model in the Rigolets Pass, the results of which were published in Technical Report No. 2-636, "Effects on Lake Pontchartrain, Louisiana, of Hurricane Surge Control Structures and Mississippi River-Gulf Outlet Channel." That report concluded that the hurricane control structures would not significantly affect the hydraulic or salinity regimen of Lake Pontchartrain. Test results showed plan 2 to be about equal in discharge capability with plan 1, while plans 2A and 2B were judged superior in discharge capability compared with plan 1. Possible scouring problems near the Fort Pike State Monument were noticed during testing of plans 2, 2A, and 2B. To remedy this situation a modification to plan 2A was made. The structure was shifted 250 ft away from the Fort Pike bank of the Rigolets Pass. This modification is referred to as plan 2A-1. This plan proved to have superior discharge capability relative to plan 1 as well as to reduce possible scouring problems near the Fort Pike State Monument. Additional data which were taken for each plan in the navigation canal with the lock open are presented in Appendix A.

PREFACE

The model investigation reported herein was the result of studies requested by the U. S. Army Engineer District, New Orleans. For the purpose of these studies, the design and construction of the model was completed by June 1974.

The study was performed during the period September 1974 to February 1976 by the Hydraulics Laboratory, U. S. Army Engineer Waterways Experiment Station (WES), under the direction of Messrs. H. B. Simmons, Chief, and F. A. Herrmann, Jr., Assistant Chief, Hydraulics Laboratory; R. A. Sager, Chief, Estuaries Division; W. H. Bobb (retired) and R. A. Boland, Jr., Chiefs, Interior Channel Branch; M. J. Trawle, Project Manager; and R. C. Berger, Jr., Project Engineer. Technicians of the Estuaries Division who assisted during the investigation included Messrs. J. A. Boyd, J. S. Ashley, and A. J. Banchetti. This report was prepared by Messrs. Berger and Boland with the assistance of Mr. Trawle.

Directors of WES during the performance of this study and the preparation and publication of this report were COL G. H. Hilt, CE, and COL J. L. Cannon, CE. Technical Director was Mr. F. R. Brown.

CONTENTS

CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
feet	0.3048	metres
miles (U. S. statute)	1.609344	kilometres
square miles (U. S. statute)	2.589988	square kilometres
feet per second	0.3048	metres per second
cubic feet per second	0.02831685	cubic metres per second

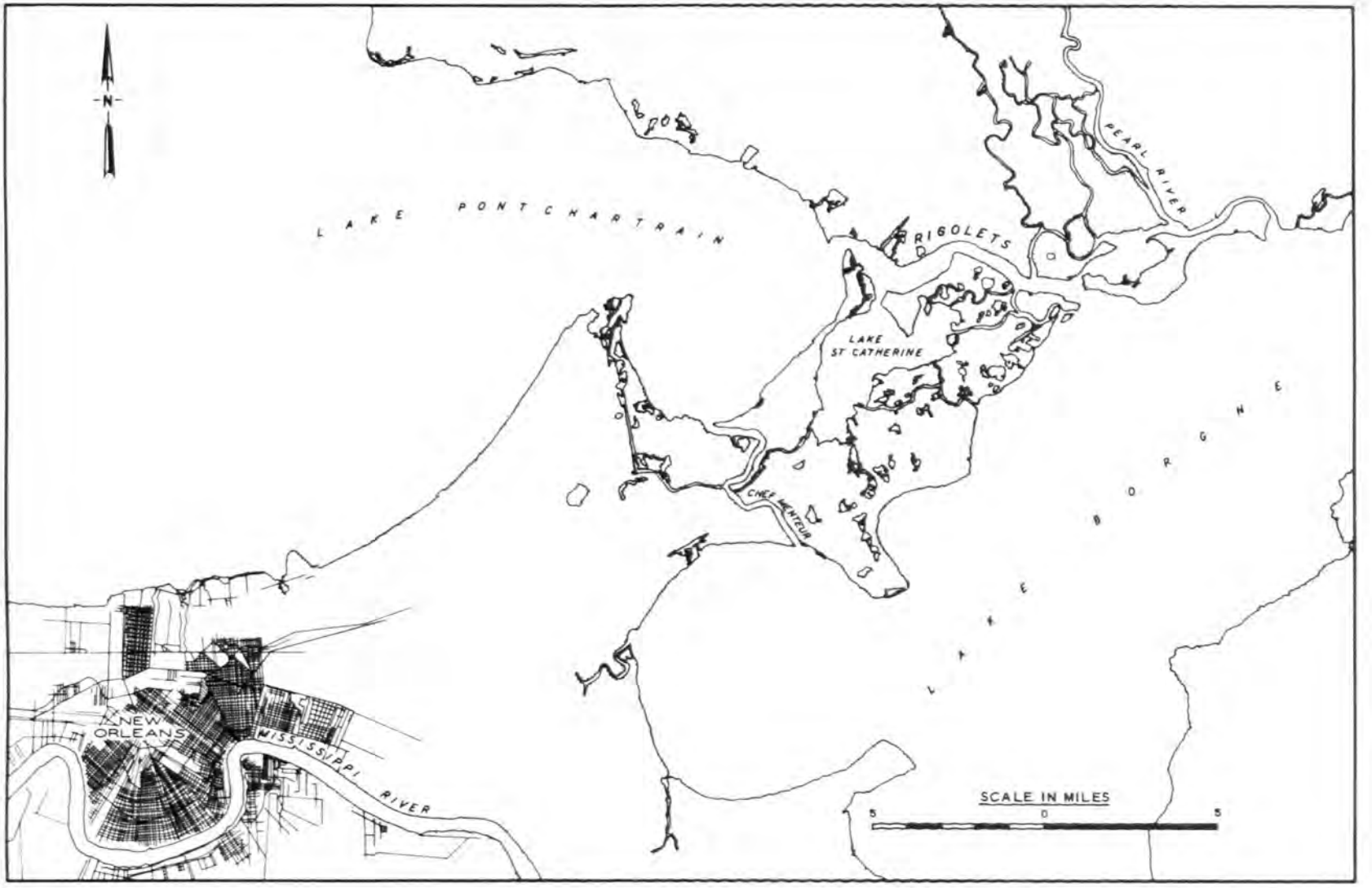

Figure 1. Vicinity map

HYDRAULIC CHARACTERISTICS OF RIGOLETS PASS, LOUISIANA, HURRICANE SURGE CONTROL STRUCTURES

Hydraulic Model Investigation

PART I: INTRODUCTION

The Prototype

1. The Rigolets and the Chef Menteur Passes are the two major natural outlets of Lake Pontchartrain, which lies adjacent to and just north of the city of New Orleans, Louisiana (Figure 1). The larger of the two, the Rigolets Pass, is about 8.5 miles* long and connects Lake Pontchartrain with Lake Borgne.

2. Gated control structures are proposed to be located in the Rigolets and the Chef Menteur Passes as a part of a hurricane protection plan for the area which will serve to protect areas contiguous to the shore of Lake Pontchartrain from flooding by limiting the uncontrolled entry of hurricane tides into the lake. During normal tide conditions, these structures will operate with their gates open, thereby allowing ebb and flood flow through the passes. These structures, which had cross-sectional areas of about 25 percent of that of the natural channel, might have had some effect on the overall regimen of Lake Pontchartrain and surrounding areas. To determine the extent of change that would result from the proposed structures, a comprehensive model study was conducted at the U. S. Army Engineer Waterways Experiment Station (WES) during the period January 1960 to June 1961. The results (published in Technical Report No. 2-636, "Effects on Lake Pontchartrain, La., of Hurricane Surge Control Structures and Mississippi River-Gulf Outlet Channel") indicated that these structures would have no significant effect on either the tide or salinities of Lake Pontchartrain. Recently, the

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* A table of factors for converting U. S. customary units of measurement to metric (SI) units is presented on page 3.

U. S. Army Engineer District, New Orleans, considered relocating and modifing the proposed Rigolets structures. Because of the possible changes that could occur in both Lake Pontchartrain and Lake Borgne, definition of the changes in the hydraulic properties of a modified structure at the new location in relation to hydraulic properties at the old location is necessary.

Purpose

3. The purpose of the studies was to: (a) provide data which would ensure that the barrier control structure would be properly sized to meet the basic requirement that the tidal regimes not be significantly altered; (b) produce data regarding velocities and flows through the structure and in adjacent areas for various structure sizes and locations; and (c) produce data regarding velocities through the navigation lock and its approach for various control structure sizes and locations.

Scope

4. The model provided the means for reproducing prototype conditions, conducting plan tests, and then studying the relative hydraulics of each plan. The model was also used to define flow characteristics approaching each structure.

PART II: THE MODEL

Description

5. The tests were accomplished in a steady-state, fixed-bed, freshwater, scaled model of 3.2 miles (about 40 percent of the entire length of the Rigolets Pass) of the Rigolets, starting at the Lake Pontchartrain entrance of the Rigolets (Figure 2). It also reproduces Sawmill Pass, which connects the Rigolets Pass and Lake St. Catherine, and about 2 square miles of Lake Pontchartrain. The model itself is about 200 ft long, 140 ft wide at the widest point, and is located within a shelter to eliminate wind effects and to permit uninterrupted operation. The model was constructed of concrete to undistorted linear scale ratios, model to prototype, of 1:100 horizontally and 1:100 vertically. Other scale ratios, model to prototype, are as follows: velocity 1:10; discharge 1:100,000; and volume 1:1,000,000.

Appurtenances

6. The model was equipped with the necessary supply pump and valves to allow any required steady-state flow and water level to be reproduced for either flood or ebb flow. The magnitude of discharge through the model was defined by three venturi meters: one to measure the flow from Sawmill Pass; another to regulate the flow from Lake Pontchartrain; and the third to regulate the discharges in the lower end of the Rigolets when the flow is in the flood direction.

7. Point gages were placed throughout the model to obtain water-surface elevations at critical locations during the testing program. These gages are graduated to 0.001 ft (0.1 ft prototype).

8. Current velocity measurements were made with miniature Price-type meters. The five-cup meters, constructed of a light plastic material, were approximately 0.04 ft in diameter (4.0 ft prototype) and were mounted on a horizontal wheel about 0.11 ft in diameter (11.0 ft prototype). The meters were calibrated frequently to ensure accurate operation and were capable of measuring actual velocities as low as about 0.03 fps (about 0.3 fps prototype).

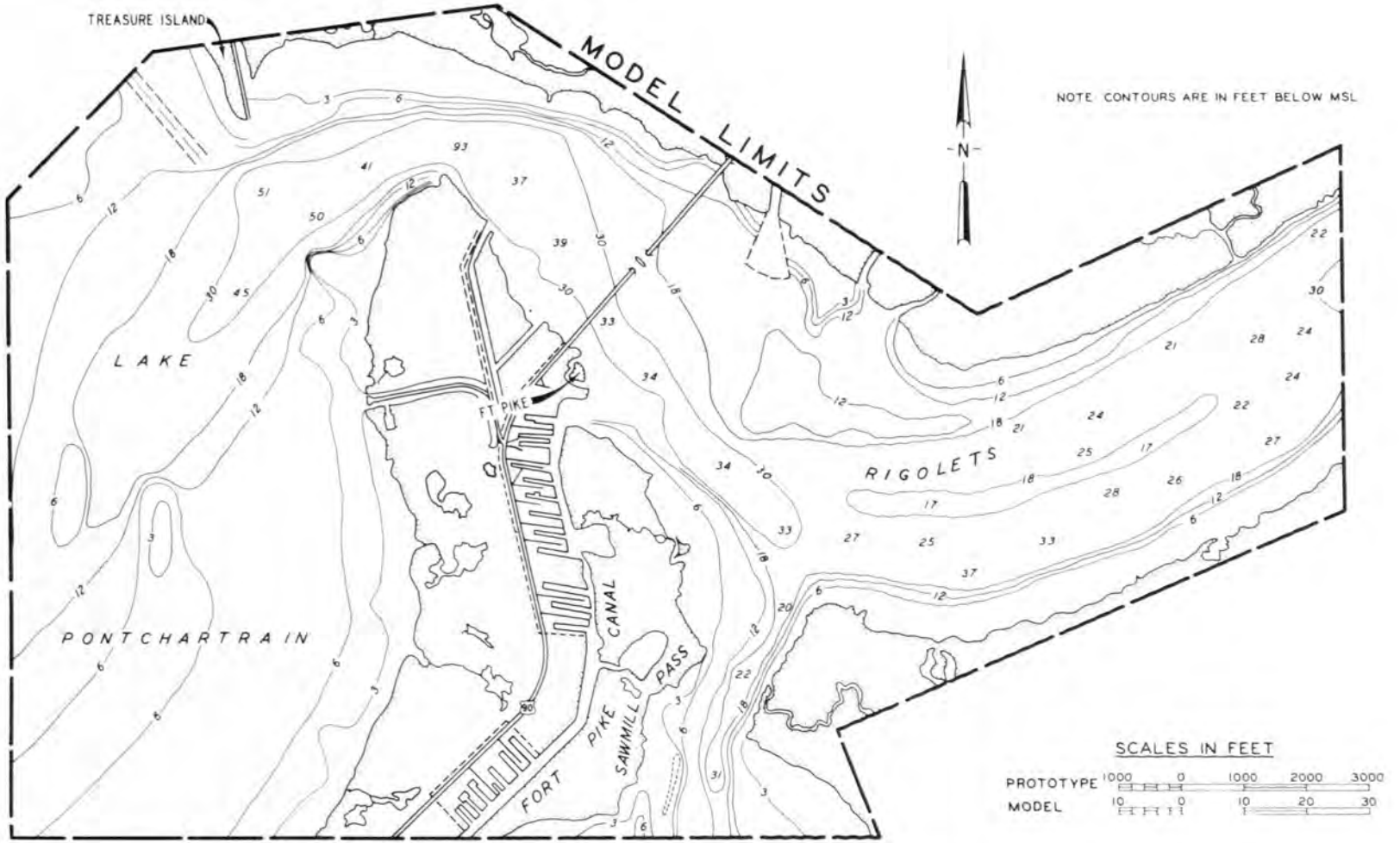


Figure 2. Existing condition of Rigolets

PART III: VERIFICATION OF THE MODEL

9. Verification of the model, or the adjustment of water-surface elevations and currents to agree with similar phenomena observed in nature, had to be accomplished before any testing could be conducted in the model. Tidal heights and velocities were observed over a complete tidal cycle in the prototype during the period 30-31 March 1974. Locations of the three tide stations and seven velocity ranges are shown in Plate 1. Each velocity range consisted of three stations at which velocity measurements were made at surface, middepth, and bottom. Since the model was operated only in a steady-state mode and did not simulate flow throughout the tidal cycle, the prototype data at the time of strength of ebb and strength of flood in the Rigolets Pass had to be used to verify the model. These data along with the model verification data are shown in Plates 1 and 2.

10. The adjustment consisted of setting the proper flow determined from the prototype data in the Rigolets and Sawmill Passes and checking the water-surface elevations and velocities throughout the model. This was done for flow in both the flood and ebb directions. After minor adjustments to the flow distribution coming from the Rigolets Pass headbay, the model and prototype measurements were in good agreement (Plates 1 and 2).

PART IV: TESTS AND RESULTS

Plans Tested

11. Five plans were tested during the course of the study. Plan 1 included the original proposed structure with 23 tidal openings (Figure 3) located in a new channel through the peninsula south of the presently existing Lake Pontchartrain end of the Rigolets (Figure 4). Plan 2 included the proposed relocated structure with 16 tidal openings (Figure 5) located in the Rigolets (Figure 6). Plans 2A and 2B (Figures 7 and 8, respectively) consisted of the proposed relocated structure with 5 and 10 additional tidal openings (Figure 5), respectively. Plan 2A-1 was the same as plan 2A, except that the tidal opening structure was moved 250 ft northeast along the axis of the barrier (Figure 9).

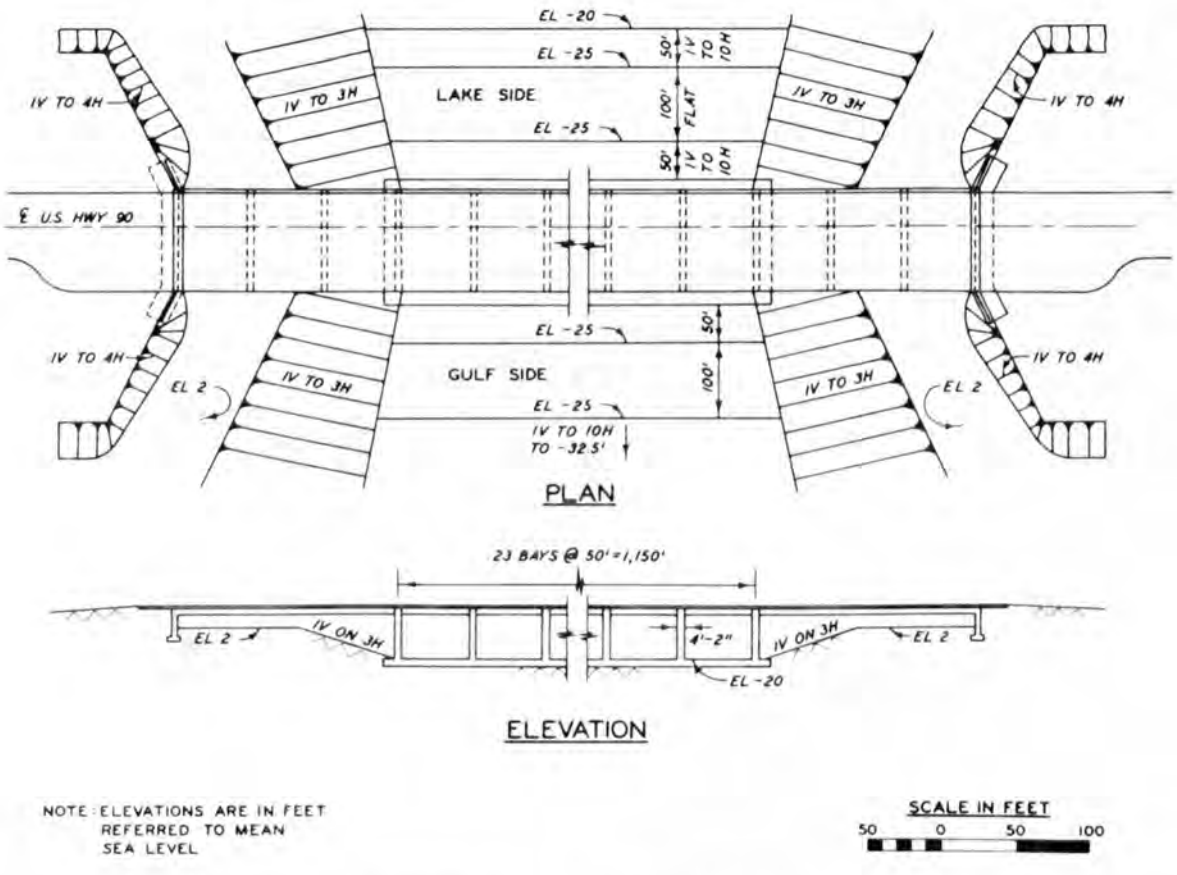


Figure 3. Plan 1 structure

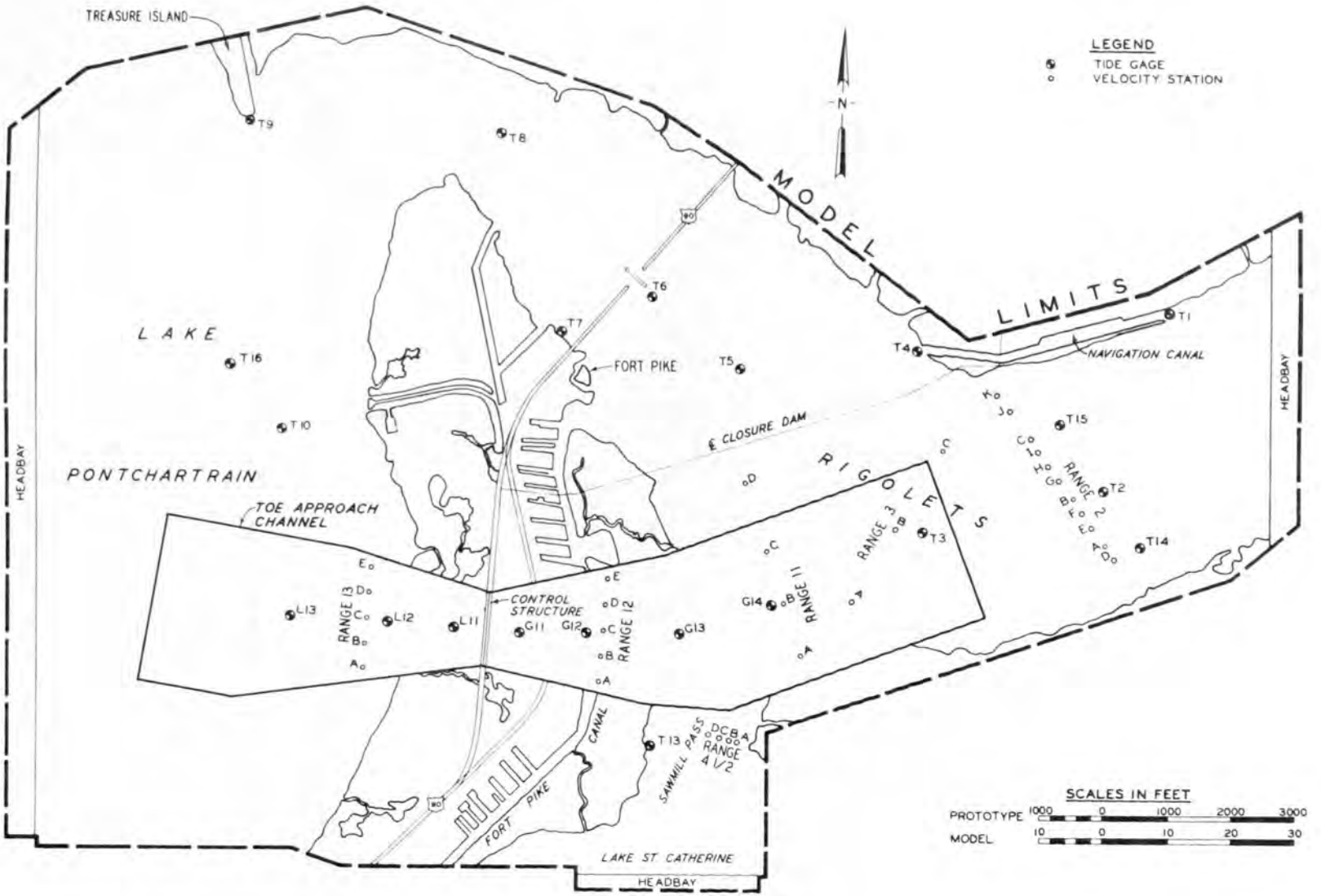


Figure 4. Details of plan 1

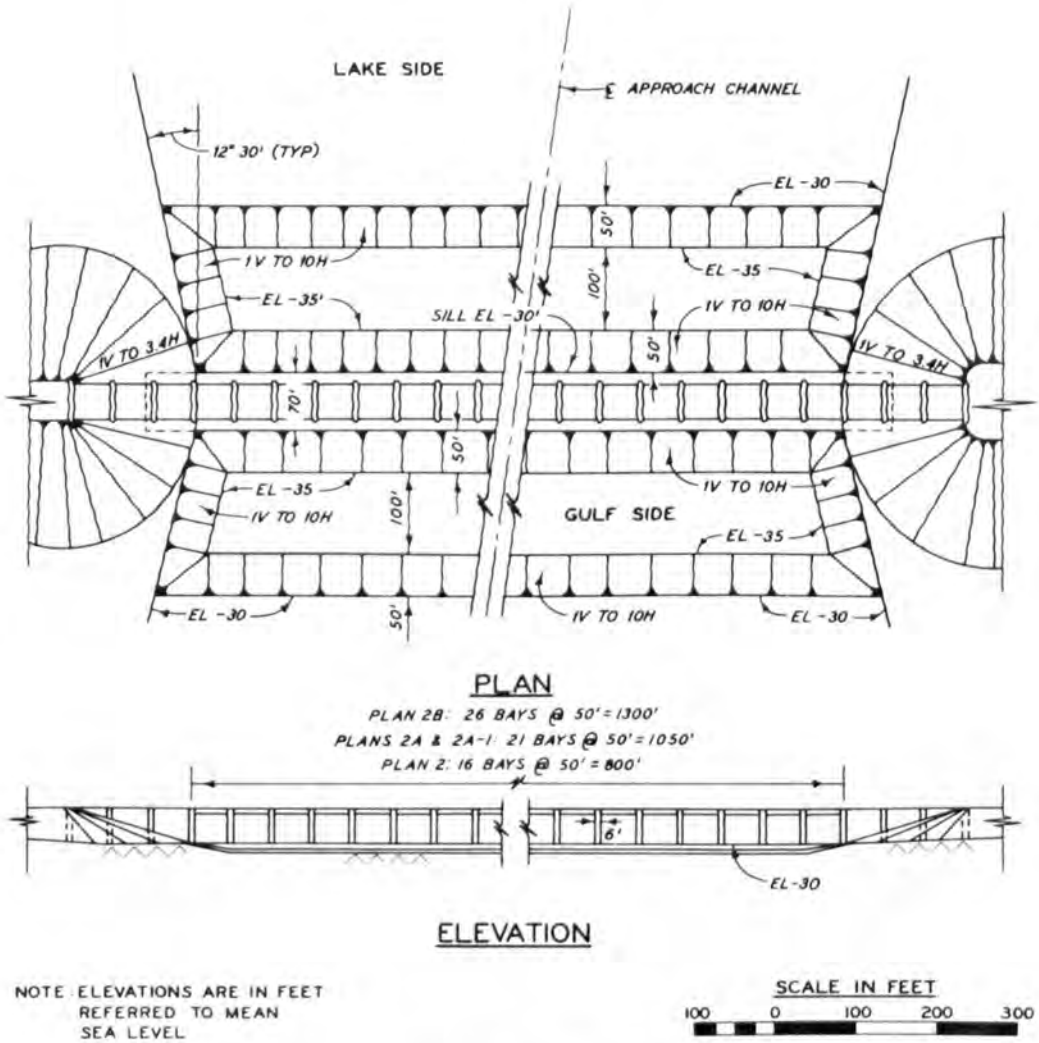


Figure 5. Plans 2, 2A, 2B, and 2A-1 structures

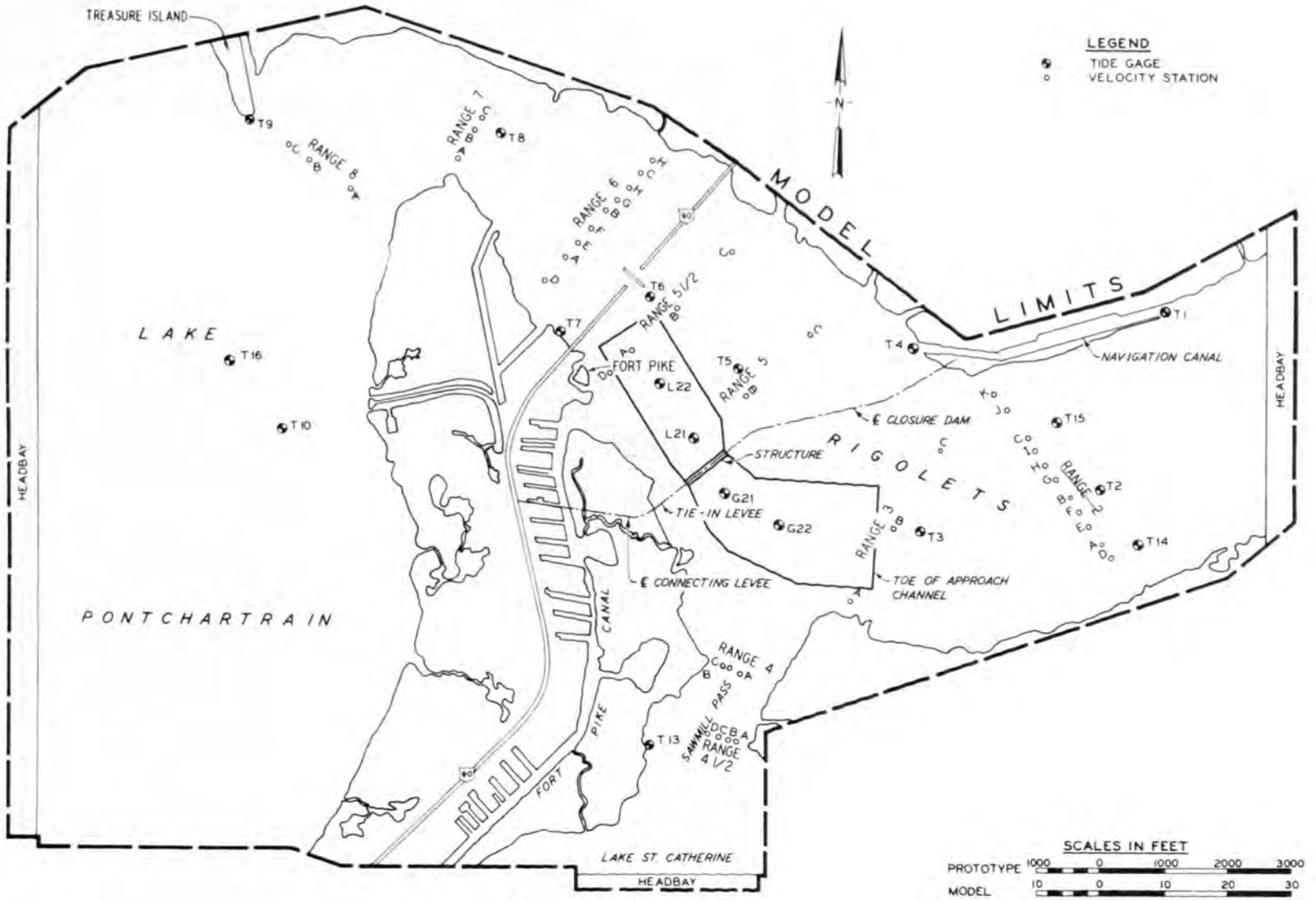


Figure 6. Details of plan 2

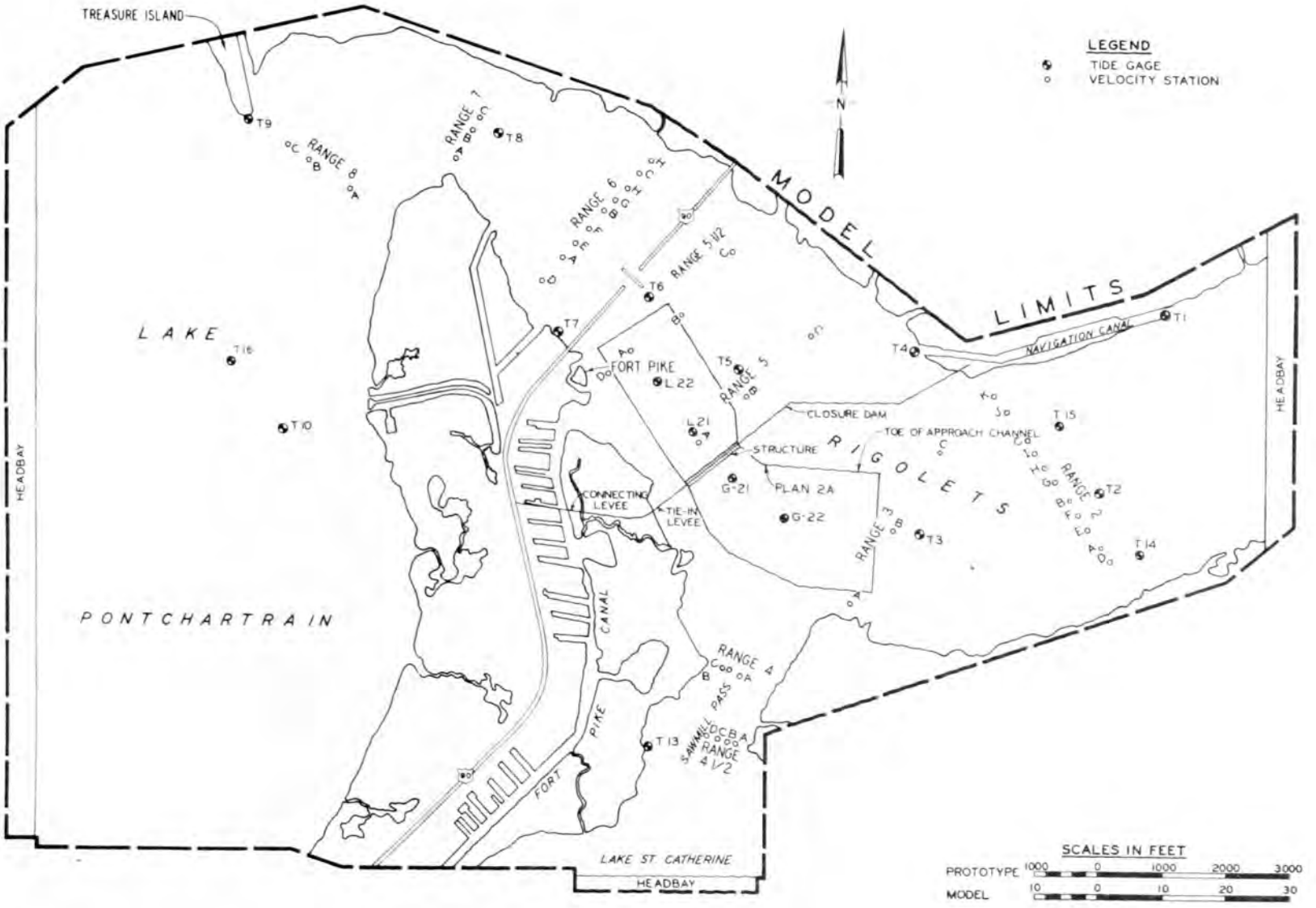


Figure 7. Details of plan 2A

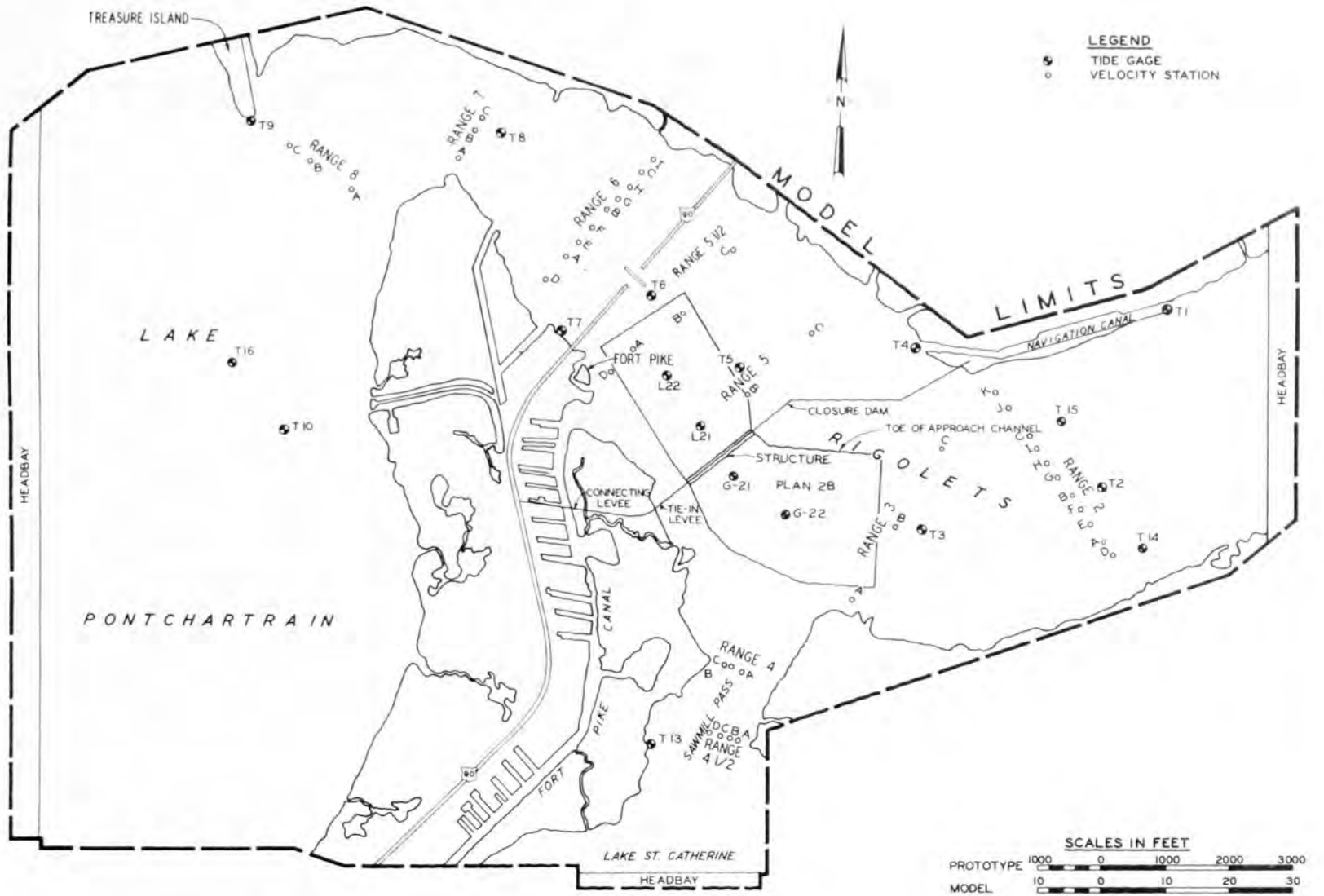


Figure 8. Details of plan 2B

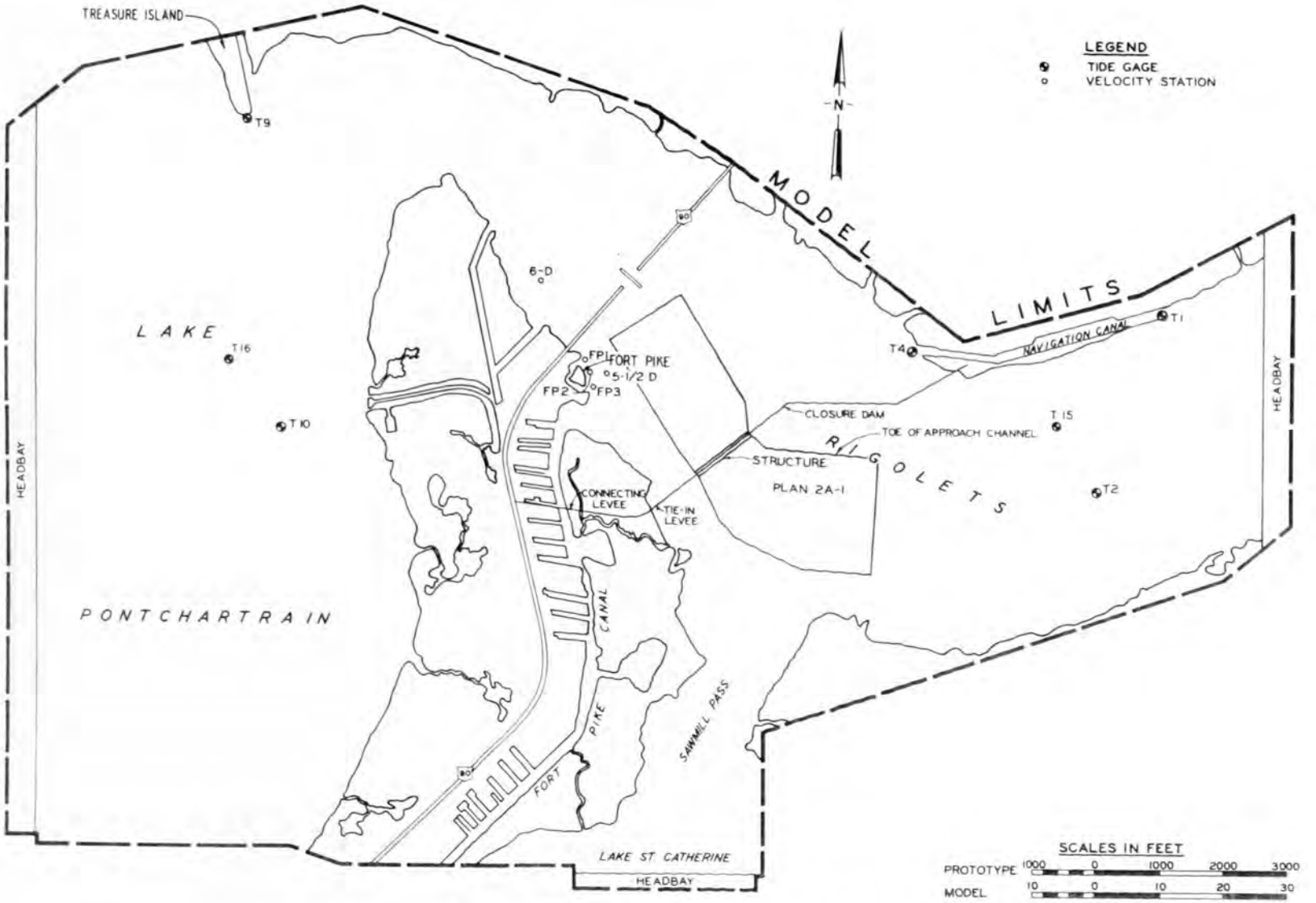


Figure 9. Details of plan 2A-1

The navigation canal along the north shore of the Rigolets near the northern end of the dam closing the Rigolets was included in each plan and not changed throughout the test program.

Test Description

12. Each plan tested was subjected to five discharges in both the flood and ebb direction as presented in the following tabulation:

	Discharge, cfs		
Flow	Structure	Sawmill Pass (Range 4-1/2)	Rigolets (Range 2)
		Flood	
A	197,000*	19,000	216,000
B	153,000*	14,000	167,000
C	132,000*	11,000	143,000
D	102,000*	11,000	113,000
E	65,000*	4,000	69,000
		Ebb	
A	206,000**	17,000	223,000
B	153,000**	15,000	168,000
C	129,000**	14,000	143,000
D	90,000**	13,000	103,000
E	63,000**	12,000	75,000

* Measured at range 12 for plan 1 and range 6 for plans 2, 2A, 2B, and 2A-1.
** Measured at range 13 for plan 1 and range 6 for plans 2, 2A, 2B, and 2A-1.

Each flow was run at a number of water-surface elevations varying from -0.1 to +2.5.† Gage T2 (Rigolets) was used as the control gage when the flow was in the flood direction and gage T10 (Lake Pontchartrain), when

† All elevations cited herein are in feet referred to mean sea level (msl).

the flow was in the ebb direction (Figure 4). For each headwater condition, water-surface elevations were measured at 21 locations throughout the model for plan 1 (Figure 4), 18 locations for plans 2, 2A, and 2B (Figures 6-8), and 7 locations for plan 2A-1 (Figure 9). Velocity measurements were obtained for each of the 10 flows at locations shown in Figures 4, 6, 7, 8, and 9. For the maximum flow (listed as flow A), velocity measurements were obtained at a headwater elevation of +2.0 and for the other flows, at a headwater elevation of +1.0. These measurements along with the water-surface elevations represent the basic data essential for comparing the relative efficiency of each plan with plan 1 and are presented in Tables A1-A24 in Appendix A. Tables A1-A4 show the velocities for plans 1, 2, 2A, and 2B and Tables A5-A24 show the water-surface elevations for plans 1, 2, 2A, and 2B.

13. Surface current patterns for plans 1, 2, and 2A-1 are shown in Photos 1-12. All photos were 10-sec time exposures of confetti floating on the water surface. A strobe light was flashed immediately before the camera lens was closed, resulting in a bright spot at approximately the end of each confetti streak to indicate the direction of flow. A scale for converting the total length of the confetti streak to surface current velocity in feet per second (prototype) is provided on each photograph. These surface current photographs were taken for flows A and C in both the ebb and flood directions. The headwaters were maintained at el +2.0 for flow A and el +1.0 for flow C. The photographs are presented in this report at a reduced scale. However, the original scale photographs were furnished the New Orleans District, and the originals are on file at the WES.

Test Results

14. The velocity and water level data (Tables A1-A24) from the basic testing program, were reduced to the form of discharge curves. The difference in water-surface levels between gages T10 and T2 was plotted as a function of the discharge passing through the structure for identical headwater elevations. Curves were then generated for each plan using

the least-squares criteria for curve fitting. Flows for each plan were compared with that of plan 1 for identical headwater elevations and water-surface differentials, the flow for plan 1 being defined as 100 percent. The results of these calculations shall be referred to as the discharge capability of a plan and are plotted in Plates 3-5. Based on the accuracy of water-surface measurements, any difference in discharge capability within ± 5 percent was not considered significant.

15. The results of testing plan 2 showed that in the ebb direction the discharge capability of this plan either equaled or exceeded that of plan 1 for all headwater elevations considered in this study. At headwater elevations of 0.0, +1.0, and +2.0, the discharge capabilities of plan 2 (Plates 3-5) were 119, 101, and 100 percent of plan 1, respectively. The only significant increase in the ebb direction of plan 2 over plan 1 was at a headwater elevation of 0.0 (Plate 3). In the flood direction, however, the discharge capability of plan 2 exceeded that of plan 1 only for a headwater elevation of 0.0 (125 percent) as shown in Plate 3. At headwater elevations of +1.0 (Plate 4) and +2.0 (Plate 5), the discharge capabilities of plan 2 were 95 and 90 percent, respectively. These values, of course, indicate a decrease in efficiency relative to plan 1. As expected, the lowest headwater elevation considered had the highest plan 2 discharge capability. This is reasonable since the plan 1 sill elevation was only -20, and the plan 2 sill elevation was -30. Since plan 1 had a lesser controlling depth and was wider than plan 2, the plan 1 design was the more depth-sensitive plan. For each increase in headwater elevation, the increase in efficiency of plan 1 was more drastic than that of plan 2. Therefore, the discharge capability of plan 2 decreased with increasing headwater elevations. However, for each subsequent increase in headwater elevation, the magnitude of the drop in discharge capability decreased. This is demonstrated by the plan 2 discharge capabilities in the flood direction. The decrease in discharge capability from a headwater elevation of 0.0 to 1.0 was 30 percent; however, from a headwater elevation of +1.0 to +2.0, the decrease in discharge capability was only 5 percent. In the ebb direction, the decrease in discharge capability of plan 2 from headwater elevations

of 0.0 to +1.0 was 18 percent; from el +1.0 to +2.0, there was only a 1 percent decrease, which was not significant.

16. The results of testing plans 2A and 2B are also presented in Plates 3-5. In the flood direction for headwater elevations of 0.0, +1.0, and +2.0, respectively, the plan 2A discharge capabilities were 154 (Plate 3), 121 (Plate 4), and 113 (Plate 5) percent while the plan 2B discharge capabilities were 185 (Plate 3), 154 (Plate 4), and 142 (Plate 5) percent. In the ebb direction for headwater elevations of 0.0, +1.0, and +2.0, the discharge capabilities of plans 2A and 2B were 156, 131, and 136 percent and 170, 144, and 141 percent, respectively. Both plans exceeded plan 1 for all conditions. For plans 2, 2A, and 2B in the ebb direction, increasing the headwater level from +1.0 to +2.0 did not result in a significant decrease in discharge capability. Plan 2A actually showed a slight increase in discharge capability for these conditions. However, the increase is considered insignificant since its magnitude is less than the precision of model measurements.

17. Examination of Photos 5-8 indicates that plan 2 caused high velocities to occur adjacent to Fort Pike. It was felt that if the structure was moved farther away from the Fort Pike bank of the Rigolets Pass, this problem could be alleviated. Therefore, the plan 2A structure (21 bays) was shifted 250 ft to the northeast along the axis of the structure, with all necessary changes to the approach channel included. This modified version of plan 2A is referred to as plan 2A-1 as shown in Figure 9.

18. Plan 2A-1 was then subjected to an abbreviated testing program. The discharge capability of plan 2A-1 was checked at a headwater elevation of +1.0 only, and the results are shown in Plate 4. In the flood direction, the discharge capability proved to be 132 percent, and in the ebb direction, 126 percent. The corresponding discharge capabilities for plan 2A were 121 percent (flood) and 131 percent (ebb). Plan 2A-1 was slightly more efficient for flood flows than plan 2A. In the ebb direction, plan 2A-1 seemed to be somewhat less efficient than plan 2A; however, the difference in discharge capabilities was not large enough to be considered significant.

19. Tests were also conducted to determine the velocities at the water level gages and velocity stations in the vicinity of Fort Pike with plan 2A-1 (Figure 9). The tests conditions and results are presented in Table 1. The surface current patterns obtained are shown in Photos 9-12.

20. The velocities around Fort Pike were reduced substantially as can be seen by comparing the corresponding surface current Photos 5-8 for plan 2 and Photos 9-12 for plan 2A-1 and from velocity measurements made at sta D on range 5-1/2 (Figure 9). For flow C in the flood direction, the velocities at sta D were as follows: (a) plan 2 - 3.7 fps (Table A2), (b) plan 2A - 2.8 fps (Table A3), (c) plan 2B - 2.4 fps (Table A4), and (d) plan 2A-1 - 1.4 fps (Table 1). The velocities taken at the three stations (FP-1, FP-2, and FP-3) located just off the bank of Fort Pike were extremely low with plan 2A-1. The maximum velocity measured at any of these stations for all flow conditions tested was 0.7 fps (Table 1).

Supplementary Tests

21. To aid in the selection of riprap, velocity measurements were made at middepth and bottom every 100 ft (prototype) along the center line of the approach channel for 500 ft on each side and in the center of the structure. The profiles were obtained for flows A and C in both the flood and ebb directions for plans 1, 2, 2A, 2B, and 2A-1. The headwater was maintained at el +2.0 for flow A and at el +1.0 for flow C. The results of these tests are presented in Plates 6-25. The velocity profiles through the structure revealed possible scouring problems downstream of the structure in plan 2 due to strong current velocities. With the addition of five more bays in the structure (plan 2A), the current velocities near the structure were reduced enough to prevent serious scouring potential.

22. Another series of tests was conducted to determine the magnitude of velocities for plans 1, 2, and 2A-1 through the navigation canal, located at the north end of the closure dam (Figure 4), with the

lock open. Velocity measurements were made at middepth in the 860-ft-long lock at the stations shown in Figure 10 along with water-surface elevations at a number of locations indicated in Tables 2-4 and Figures 4, 6, 9, and 10. The test conditions and results are also included in Tables 2-4. The maximum observed velocities were 6.5, 6.3, and 5.0 fps for plans 1, 2, and 2A-1, respectively.

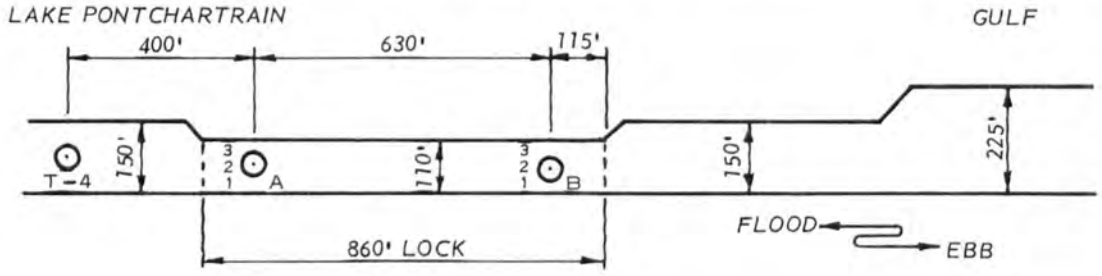


Figure 10. Plan of lock area

PART V: CONCLUSIONS

23. Based on the model results, it was concluded that plan 2 was approximately equal in efficiency to plan 1. For each increase in the cross-sectional area to plan 2, i.e., plans 2A and 2B, an increase in efficiency resulted. Plan 2A-1 had the same cross-sectional area and about the same overall efficiency as plan 2A. Plans 2A, 2B, and 2A-1 had efficiencies which exceeded that of plan 1 for all conditions under which each was tested. Plan 2A-1 significantly reduced velocities adjacent to Fort Pike.

Table 1

Velocities and Water-Surface Elevations in the Vicinity of Fort Pike, Plan 2A-1

Station	Flow A		Flow B		Flow C		Flow D		Flow E	
	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
					Velocities, fps					
5-1/2 D	2.2	1.8	1.4	1.4	1.4	1.2	1.1	0.9	1.0	0.6
FP1	0.7	0.5	0.4	0.6	0.5	0.4	0.3	0.2	0.2	0.2
FP2	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2
FP3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2
6D	3.7	1.4	2.8	1.2	2.5	1.0	1.8	0.6	1.2	0.4
					Water-Surface Elevations, ft msl					
T2	2.00	0.80	0.95	0.15	1.00	0.60	1.00	0.70	1.00	0.90
T15	2.00	0.80	0.95	0.15	1.00	0.60	1.00	0.65	1.00	0.90
T1	2.00	0.65	0.90	0.00	1.10	0.50	1.00	0.60	1.00	0.90
T4	1.10	2.10	0.40	1.05	0.70	1.15	0.85	1.00	1.00	1.00
T10	1.00	2.05	0.20	1.00	0.50	1.10	0.65	1.00	0.85	1.00
T16	0.90	2.00	0.20	1.00	0.50	1.10	0.65	1.00	0.85	1.00
T9	1.00	2.05	0.30	1.00	0.50	1.10	0.70	1.00	0.90	1.00

Table 2

Velocities and Water-Surface Elevations in the Navigation Canal, Plan 1

Station	Flow A		Flow C		Flow D	
	Flood	Ebb	Flood	Ebb	Flood	Ebb
			Velocities, fps			
A1	5.1	4.1	3.1	2.9	2.5	1.9
A2	5.5	5.8	3.3	3.6	2.7	2.5
A3	4.2	6.2	2.7	4.3	2.2	3.0
B1	5.4	5.8	3.3	3.2	2.8	1.9
B2	4.9	6.5	3.3	4.0	2.5	2.9
B3	3.7	6.5	2.5	4.3	1.9	3.0
			Water-Surface Elevations, ft msl			
T1	1.35	0.15	0.90	0.10	0.80	0.70
T2	1.90	0.30	1.10	0.10	0.90	0.65
T14	1.95	0.35	1.15	0.20	1.00	0.75
T15	1.90	0.30	1.10	0.00	0.90	0.65
T3	1.80	0.45	1.10	0.25	0.85	0.75
T16	-0.40	2.15	0.00	1.10	0.20	1.10
T10	-0.40	2.20	0.05	1.05	0.25	1.10
T9	-0.25	2.20	0.15	1.05	0.30	1.10
T8	-0.25	2.20	0.15	1.05	0.30	1.10
T7	-0.20	2.20	0.20	1.10	0.30	1.15
T6	-0.20	2.20	0.25	1.05	0.35	1.10
T5	-0.30	2.15	0.15	1.05	0.25	1.10
T4	-0.15	1.90	0.30	0.90	0.45	1.00

Table 3

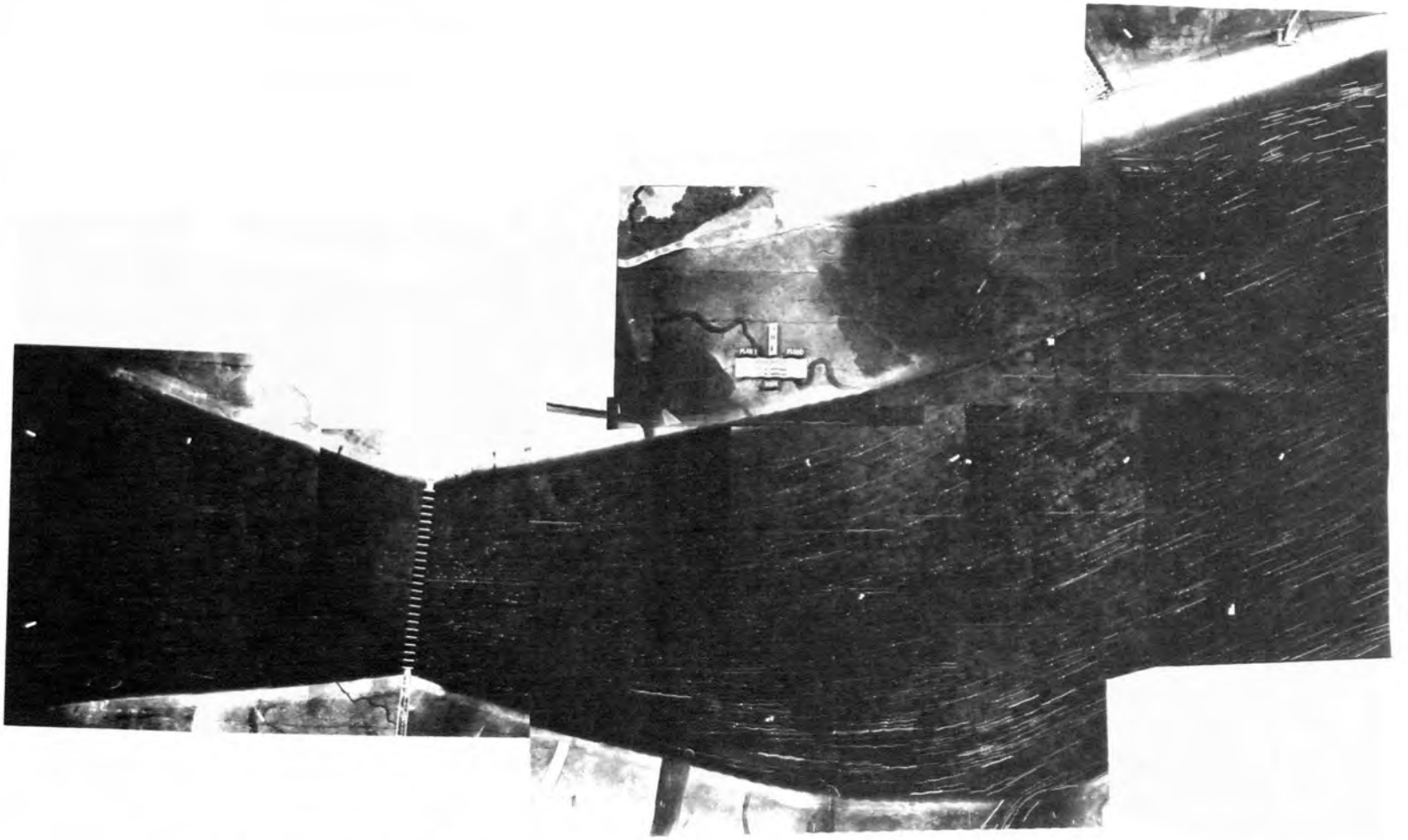
Velocities and Water-Surface Elevations in the Navigation Canal, Plan 2

Station	Flow A		Flow C		Flow D	
	Flood	Ebb	Flood	Ebb	Flood	Ebb
			Velocities, fps			
A1	5.2	3.8	3.6	2.3	2.9	1.6
A2	5.0	5.9	3.6	3.6	2.5	2.4
A3	4.0	6.3	2.7	4.0	1.7	2.8
B1	5.0	5.0	3.6	3.4	2.7	1.8
B2	5.2	6.3	3.6	3.8	2.7	2.5
B3	3.4	6.3	2.7	4.2	1.9	3.0
			Water-Surface Elevations, ft msl			
T1	1.60	-0.05	0.70	0.15	1.00	0.60
T2	2.00	0.10	0.95	0.20	0.90	0.65
T14	2.00	0.05	0.80	0.20	0.95	0.65
T15	2.00	0.10	0.90	0.15	0.90	0.65
T3	1.90	0.00	0.80	0.15	0.85	0.55
G22	1.80	0.15	0.70	0.25	0.85	0.65
G21	1.55	0.40	0.70	0.25	0.80	0.75
L21	0.40	1.45	0.10	0.80	0.45	0.85
L22	0.40	1.75	0.10	0.90	0.45	0.95
T4	0.40	1.65	0.10	0.80	0.40	0.90
T5	0.40	1.85	0.05	0.95	0.40	0.95
T6	0.35	1.85	0.05	0.95	0.45	1.00
T7	0.25	1.85	0.00	0.90	0.35	0.95
T8	0.30	1.90	0.00	0.90	0.35	1.00
T9	0.25	1.95	0.00	1.00	0.35	0.95
T10	0.35	2.00	0.00	1.00	0.35	0.95
T16	0.25	2.00	0.00	1.00	0.40	1.00
T13	1.80	0.45	0.70	0.20	0.95	0.70

Table 4

Velocities and Water-Surface Elevations in the Navigation Canal, Plan 2A-1

Station	Flow A		Flow C		Flow D	
	Flood	Ebb	Flood	Ebb	Flood	Ebb
			Velocities, fps			
A1	3.4	2.9	2.3	1.9	1.9	1.3
A2	3.4	4.2	2.5	2.9	1.7	1.9
A3	2.7	5.0	1.7	3.6	1.5	2.3
B1	3.8	3.4	2.5	2.7	1.9	1.5
B2	3.8	4.8	2.5	3.3	1.7	1.9
B3	2.5	5.4	1.7	3.6	1.5	2.4
			Water-Surface Elevations, ft msl			
T1	1.80	0.80	1.00	0.60	1.10	0.90
T2	2.00	0.95	1.00	0.60	1.10	0.90
T15	2.00	0.95	1.00	0.60	1.10	0.90
T4	1.20	1.90	0.70	1.00	1.05	1.15
T9	1.00	2.00	0.55	1.10	0.80	1.10
T10	0.95	2.00	0.55	1.05	0.80	1.00
T16	0.95	2.00	0.55	1.05	0.80	1.00



WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN=-0.50
RIGOLETS-STA T2=2.00

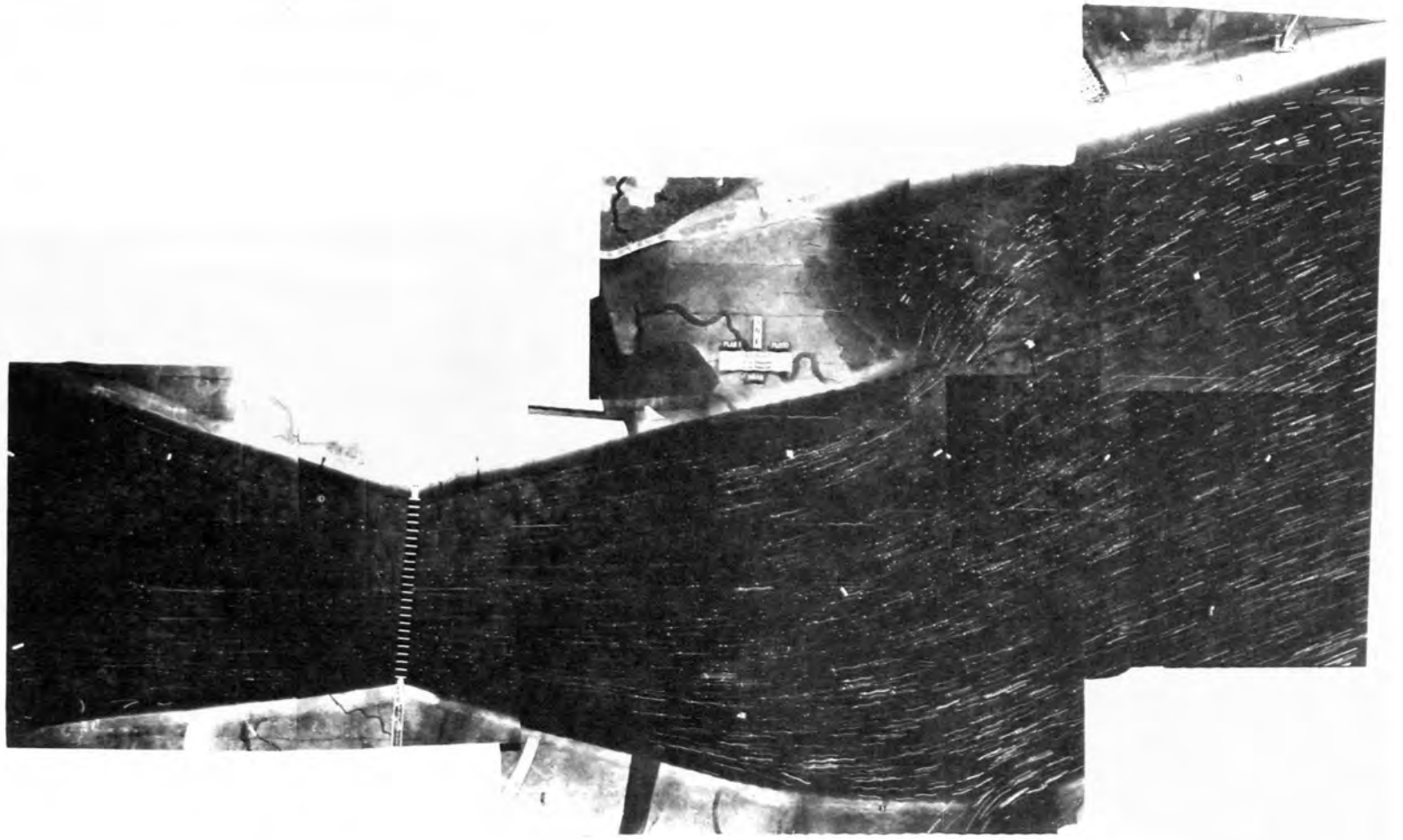
VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 1
SURFACE CURRENT PATTERNS
FLOOD FLOW = 216,000 CFS (A)

PHOTO 1

PHOTO 2

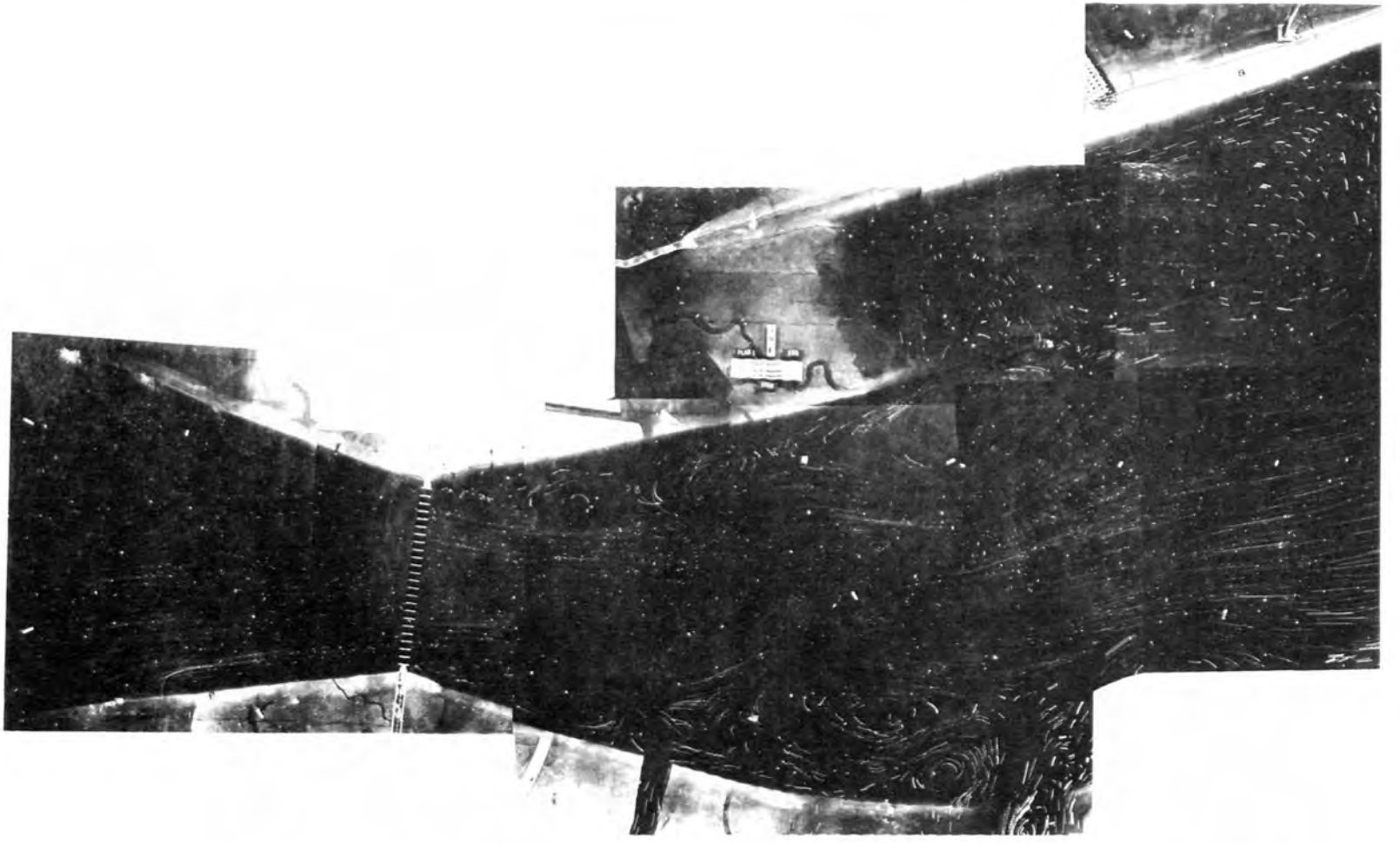


WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN= 0.00
RIGOLETS-STA T2= 0.95

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 1
SURFACE CURRENT PATTERNS
FLOOD FLOW = 143,000 CFS (C)



WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 2.15
RIGOLETS-STA T2 = 0.00

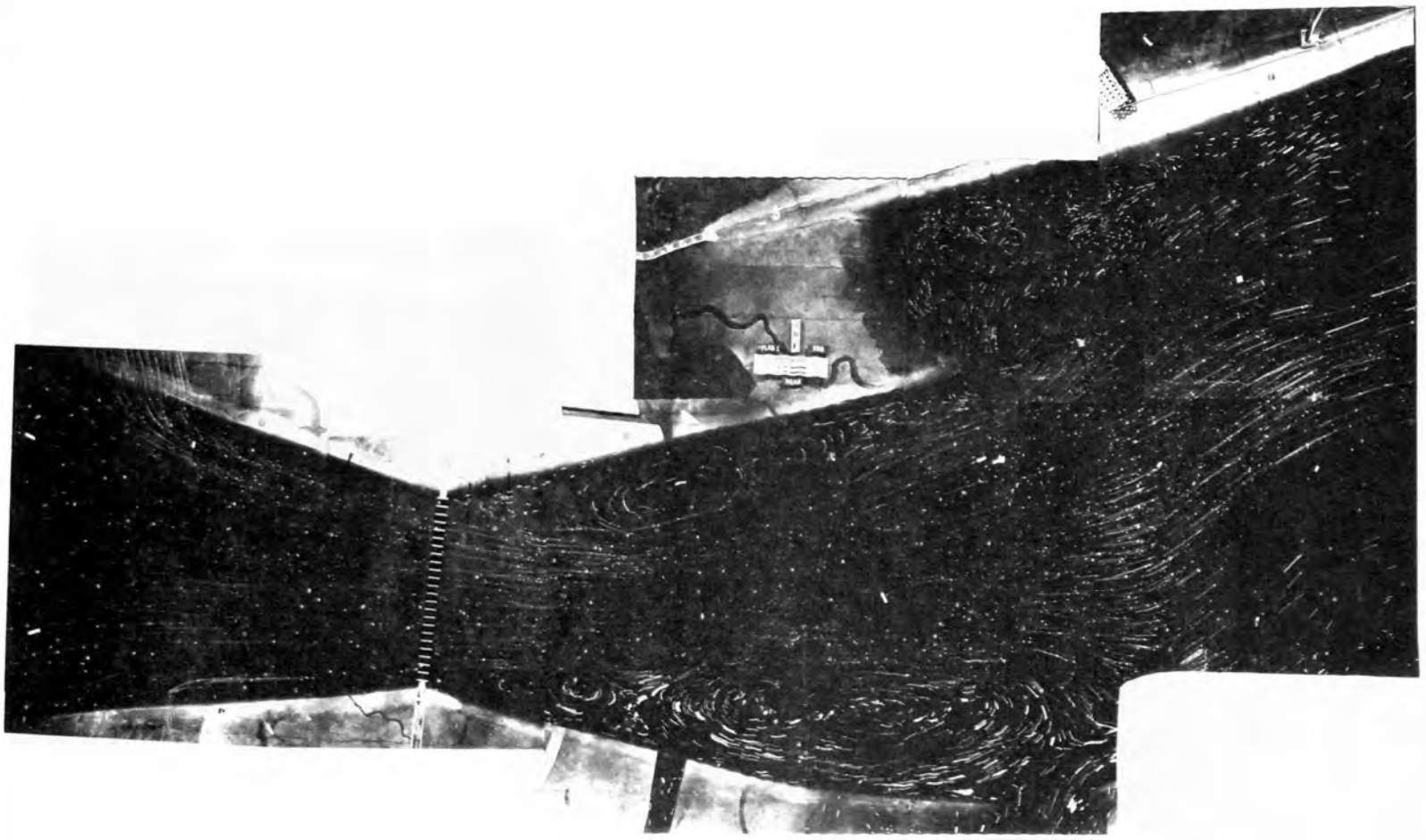
VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 1
SURFACE CURRENT PATTERNS
EBB FLOW = 223,000 CFS (A)

PHOTO 3

PHOTO 4

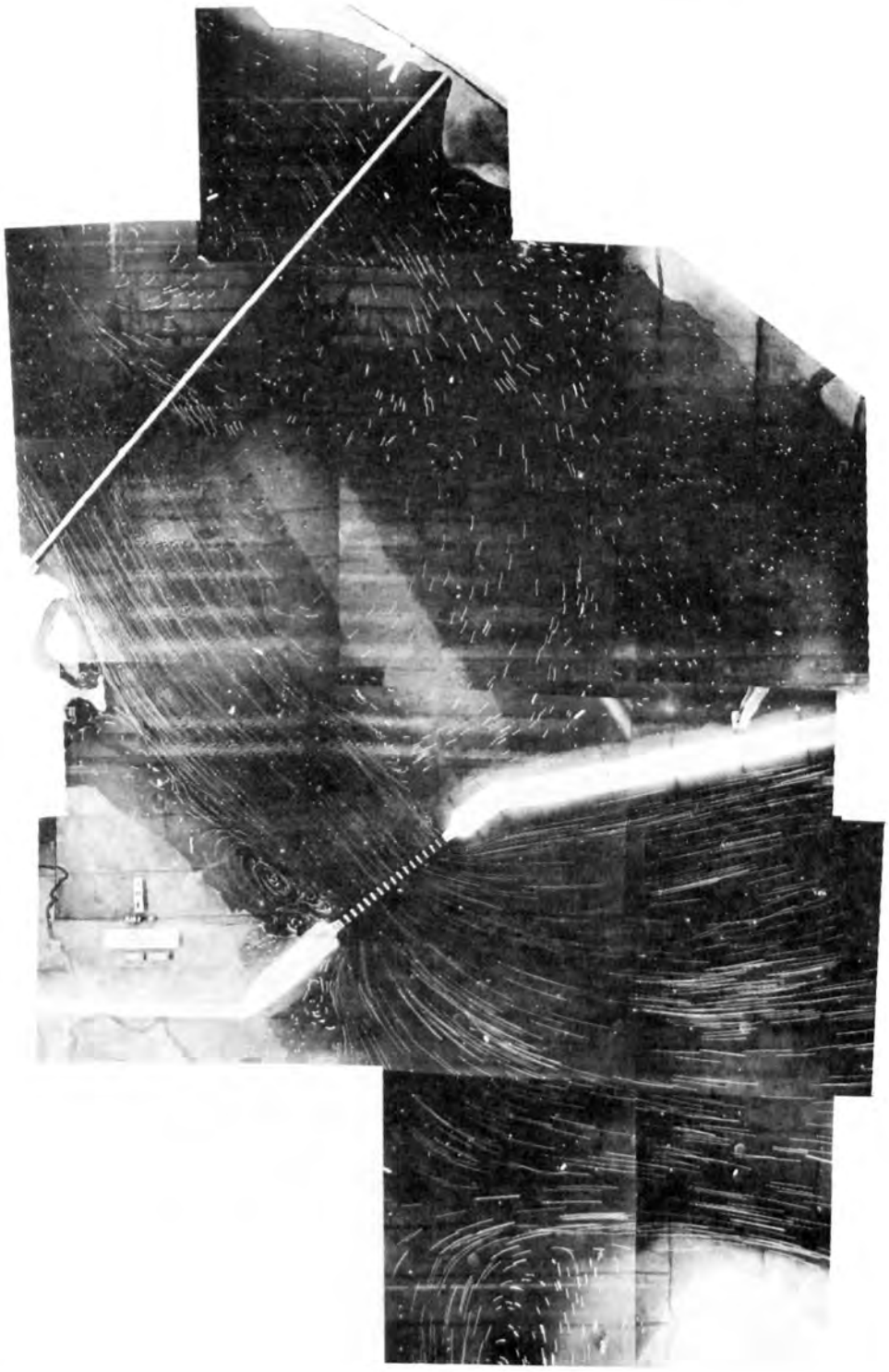


WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 1.00
RIGOLETS-STA T2=-0.15

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 1
SURFACE CURRENT PATTERNS
EBB FLOW = 143,000 CFS (C)



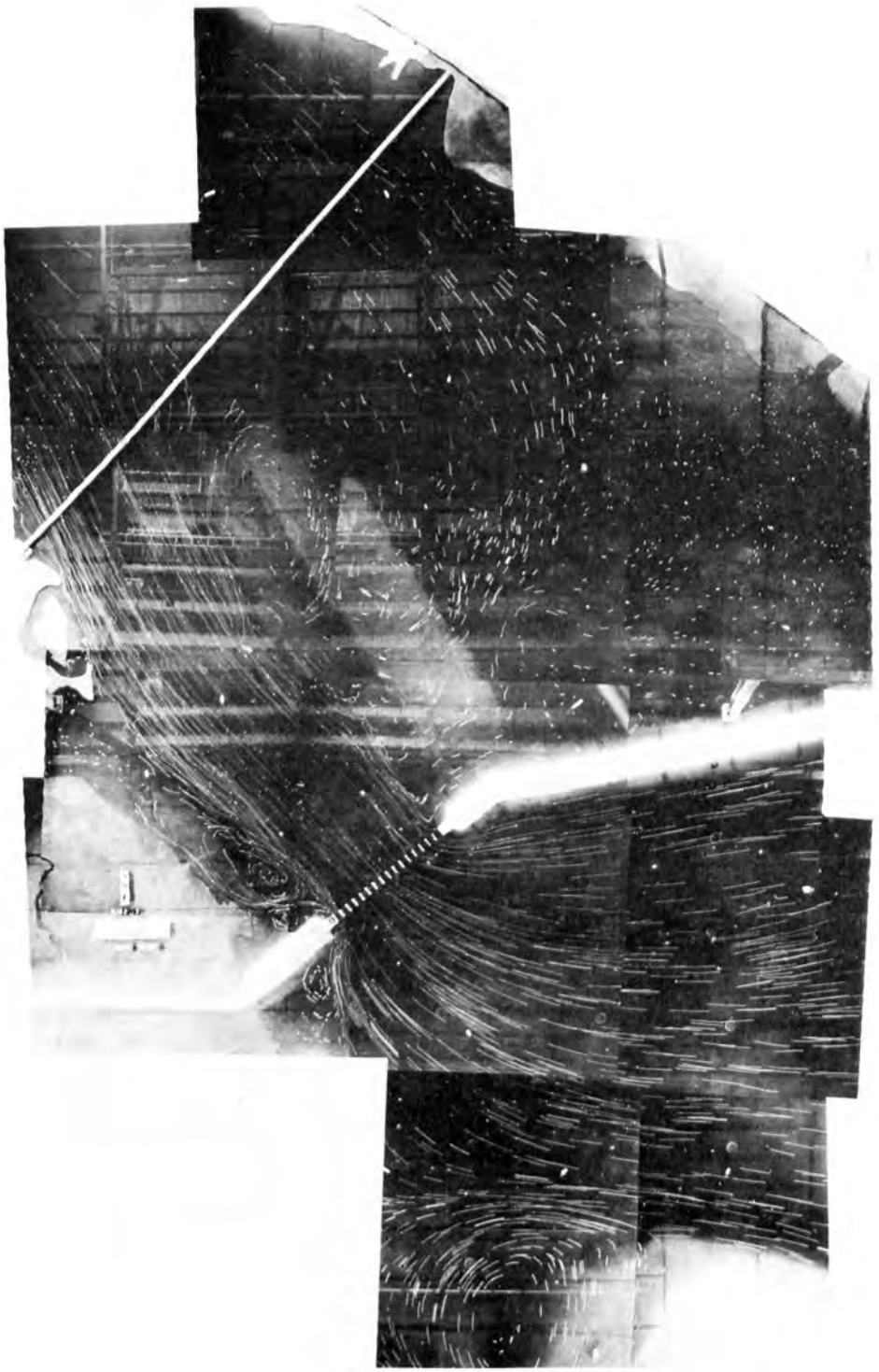
WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 0.05
RIGOLETS-STA T2 = 1.95

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2
SURFACE CURRENT PATTERNS
FLOOD FLOW = 216,000 CFS (A)

PHOTO 5



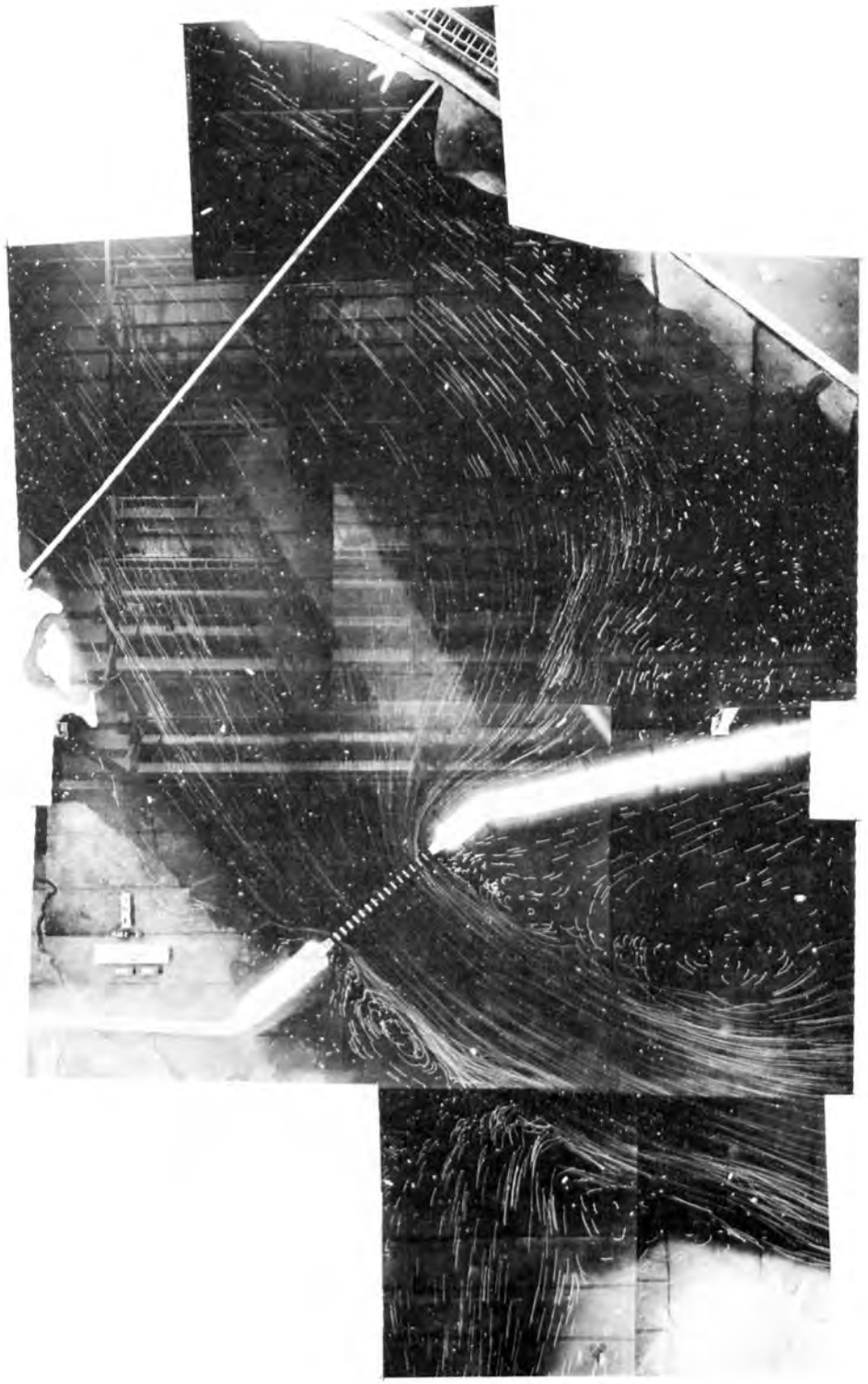
WATER-SURFACE ELEVATIONS, FT MSL.
LAKE PONTCHARTRAIN = 0.00
RIGOLETS-STA T2 = 0.95

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2
SURFACE CURRENT PATTERNS
FLOOD FLOW = 143,000 CFS (C)

PHOTO 6



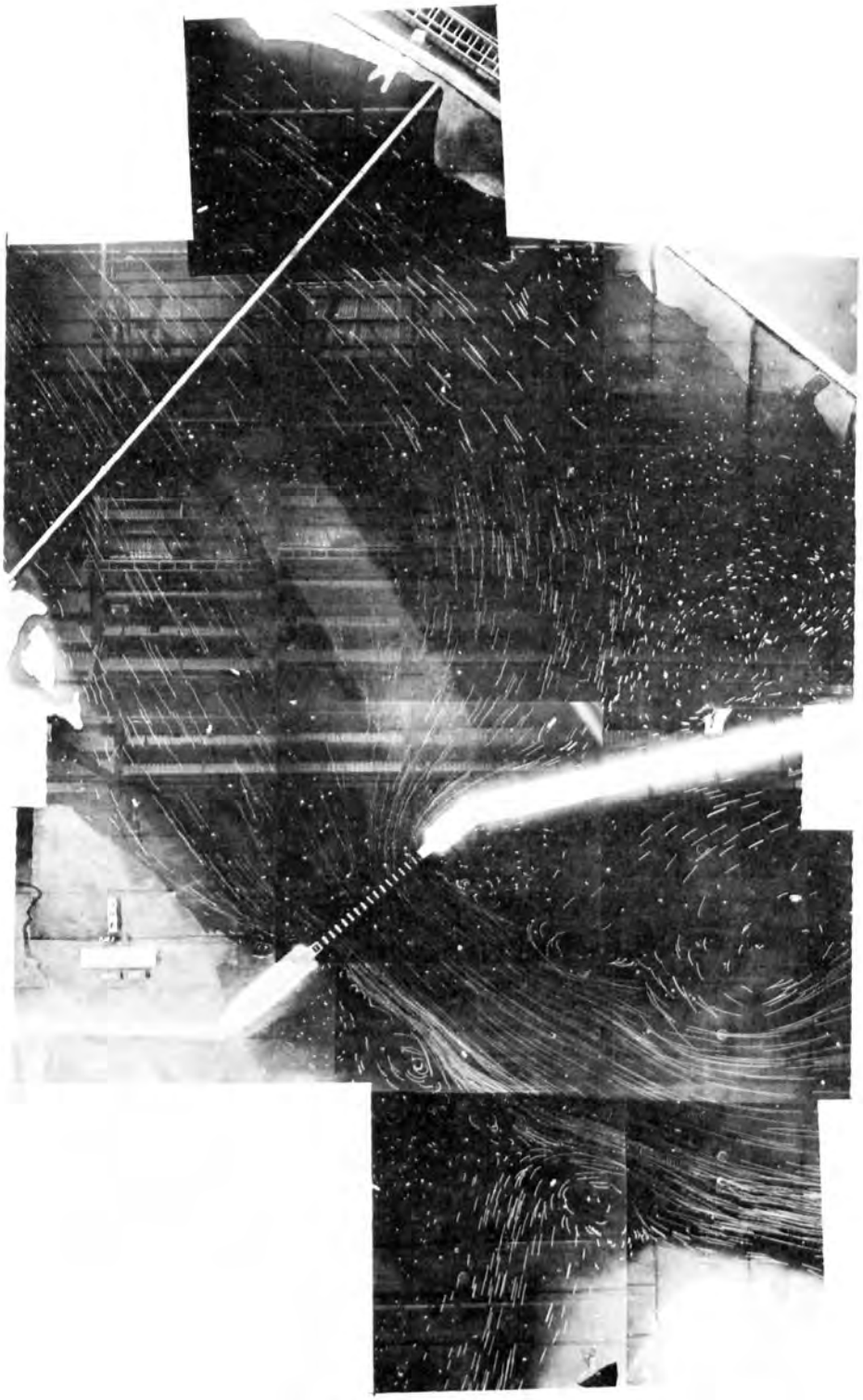
WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 2.00
RIGOLETS-STA T2 = -0.05

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2
SURFACE CURRENT PATTERNS
EBB FLOW = 223,000 CFS (A)

PHOTO 7



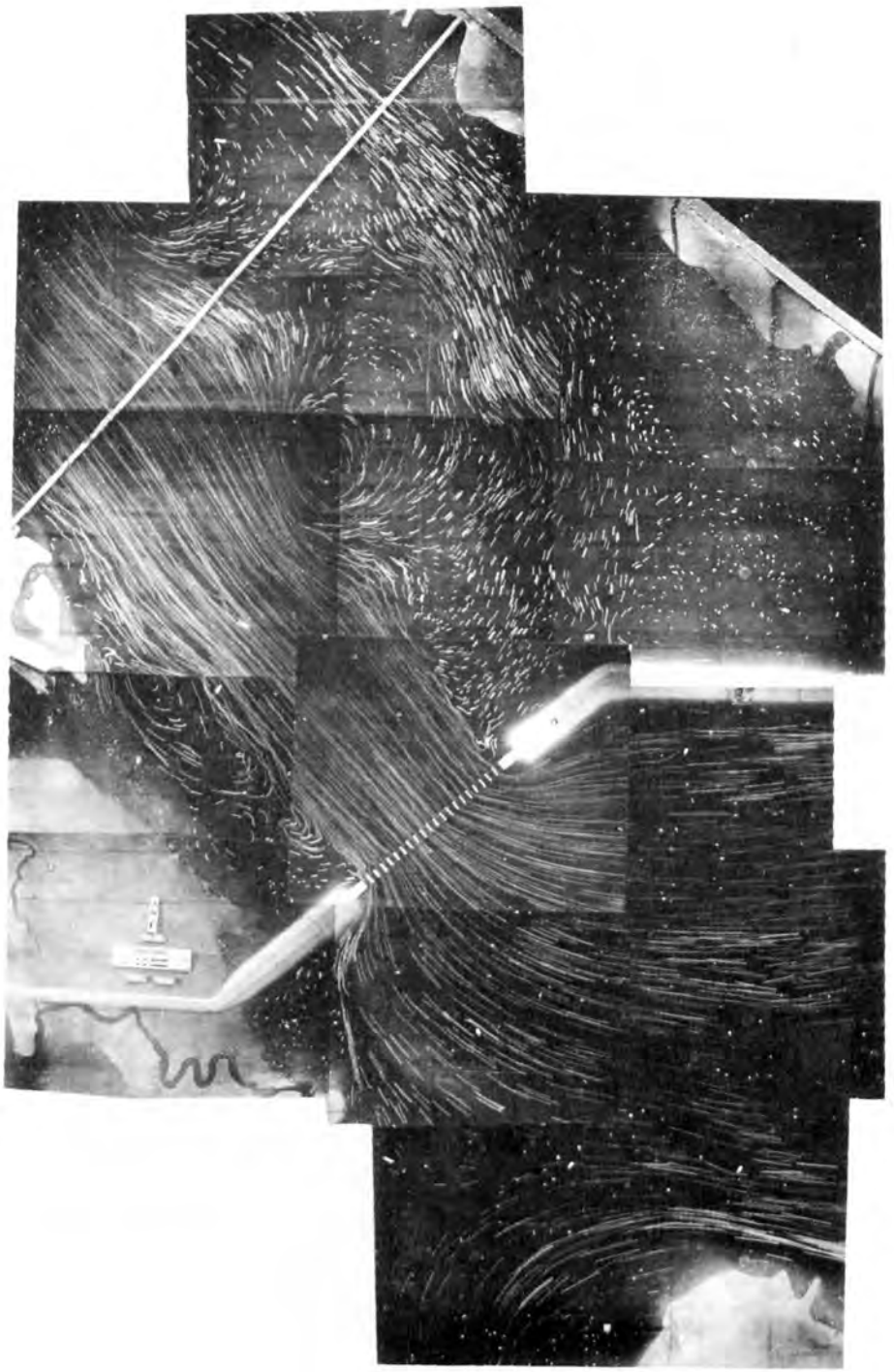
WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 1.00
RIGOLETS-STA T2 =0.05

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2
SURFACE CURRENT PATTERNS
EBB FLOW = 143,000 CFS (C)

PHOTO 8



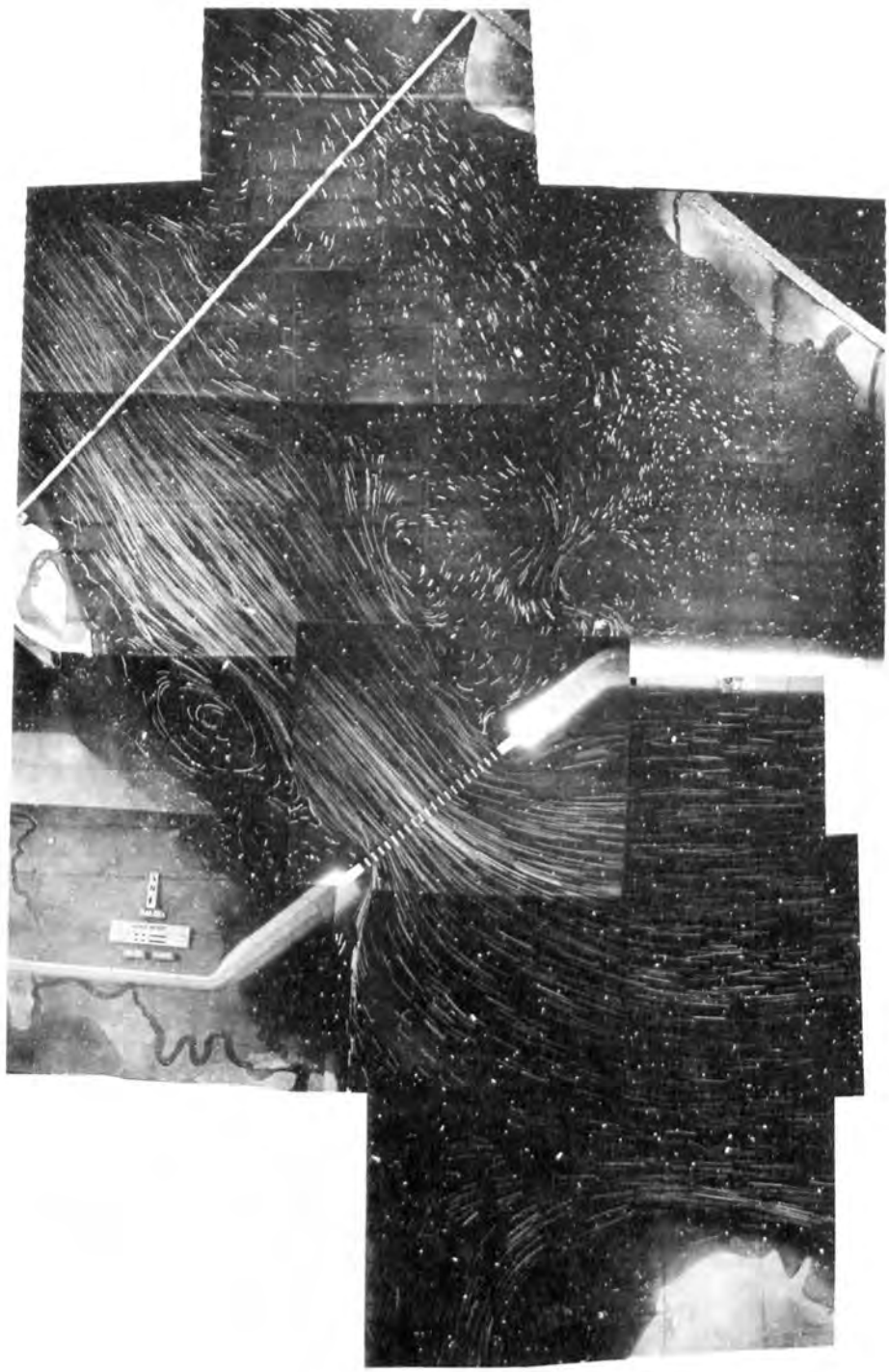
WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 1.00
RIGOLETS-STA T2=200

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2A-1
SURFACE CURRENT PATTERNS
FLOOD FLOW = 216,000 CFS (A)

PHOTO 9



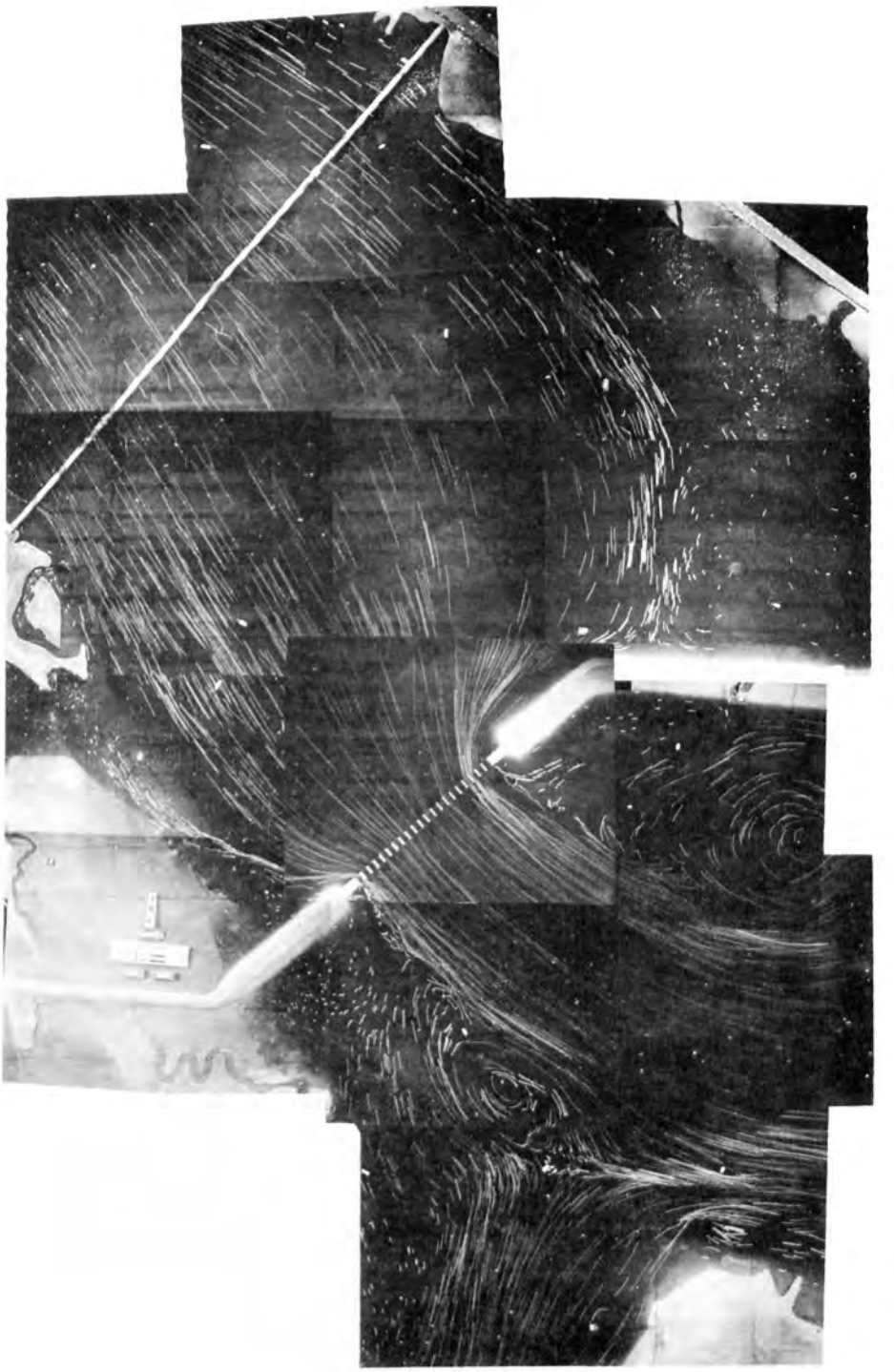
WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 0.50
RIGOLETS-STA T2=1.00

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2A-1
SURFACE CURRENT PATTERNS
FLOOD FLOW = 143,000 CFS (C)

PHOTO 10



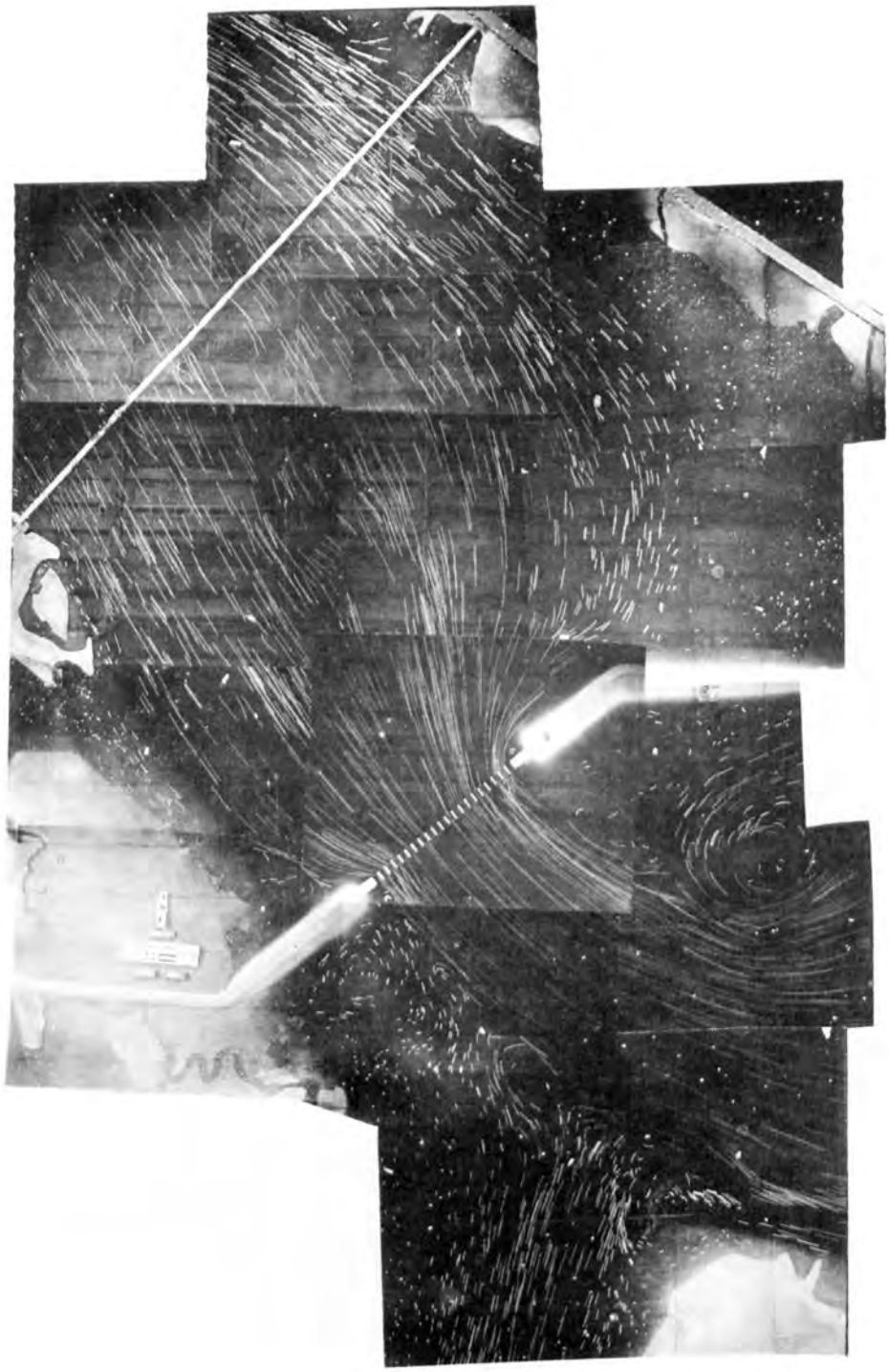
WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 2.00
RIGOLETS-STA 12 = 0.75

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2A-1
SURFACE CURRENT PATTERNS
EBB FLOW = 223,000 CFS (A)

PHOTO 11



WATER-SURFACE ELEVATIONS, FT MSL
LAKE PONTCHARTRAIN = 1.00
RIGOLETS-STA T2=0.50

VELOCITY SCALE IN FPS

2 0 2 4 6 8 10

PLAN 2A-1
SURFACE CURRENT PATTERNS
EBB FLOW = 143,000 CFS (C)

PHOTO 12

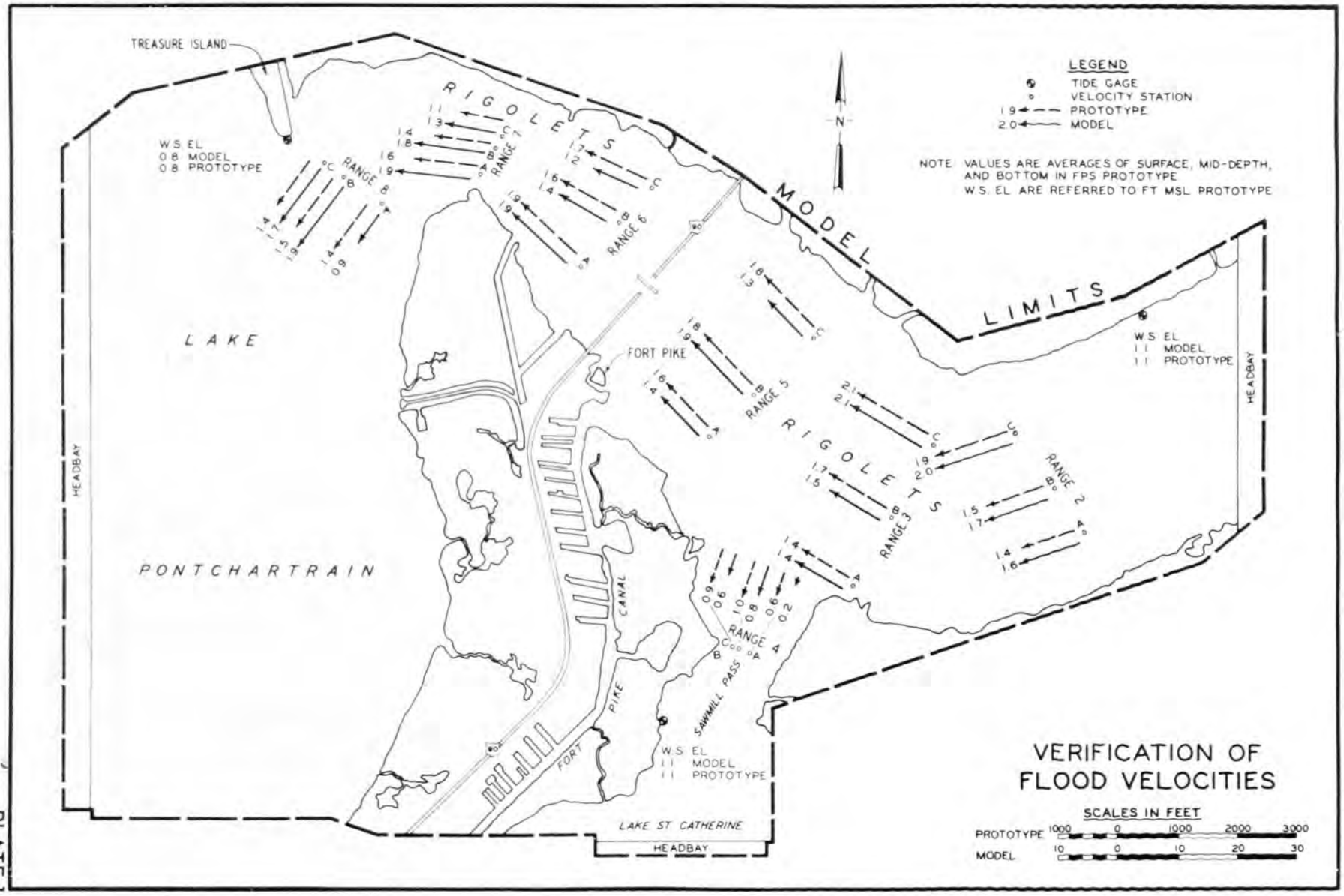
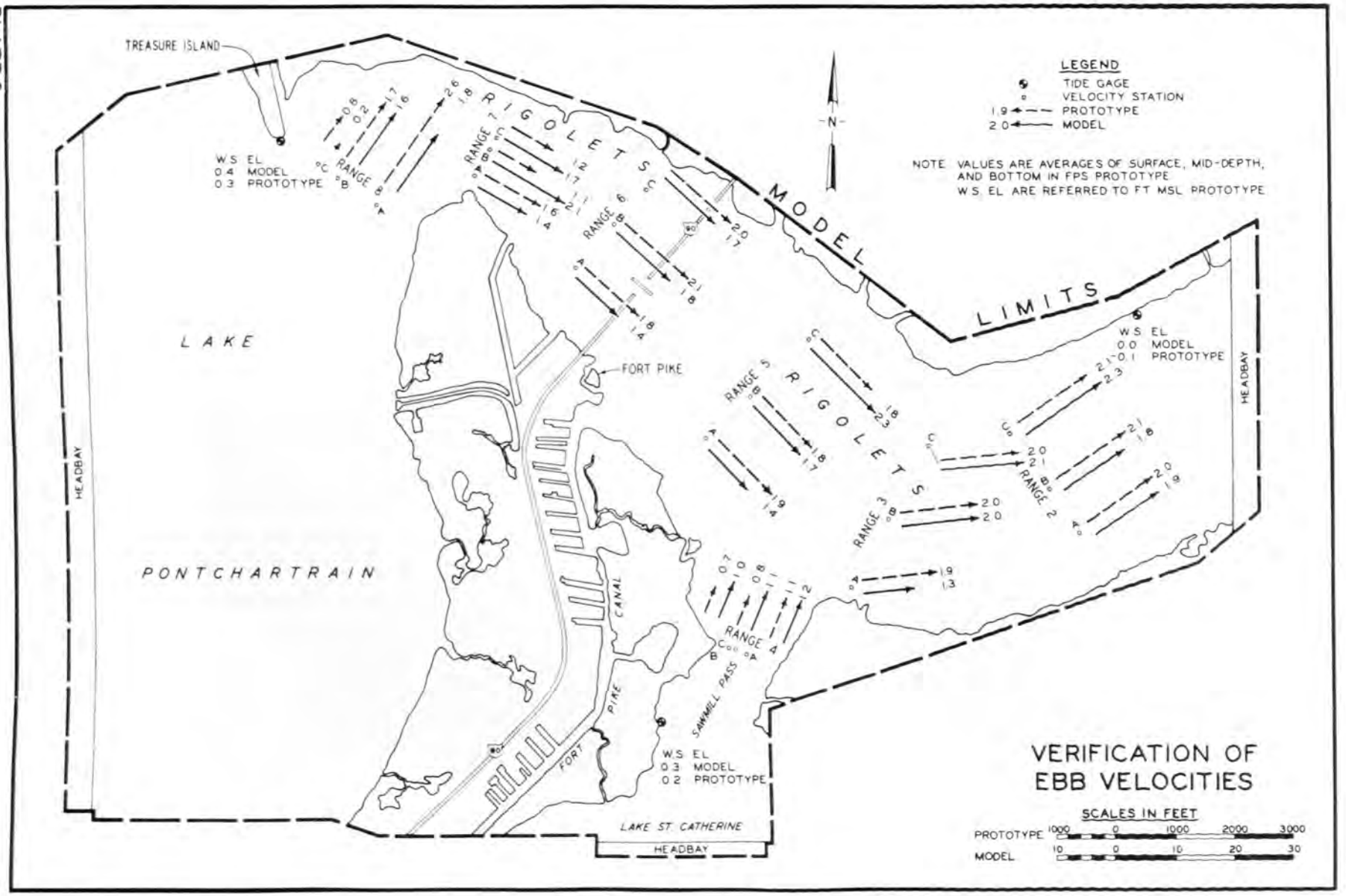
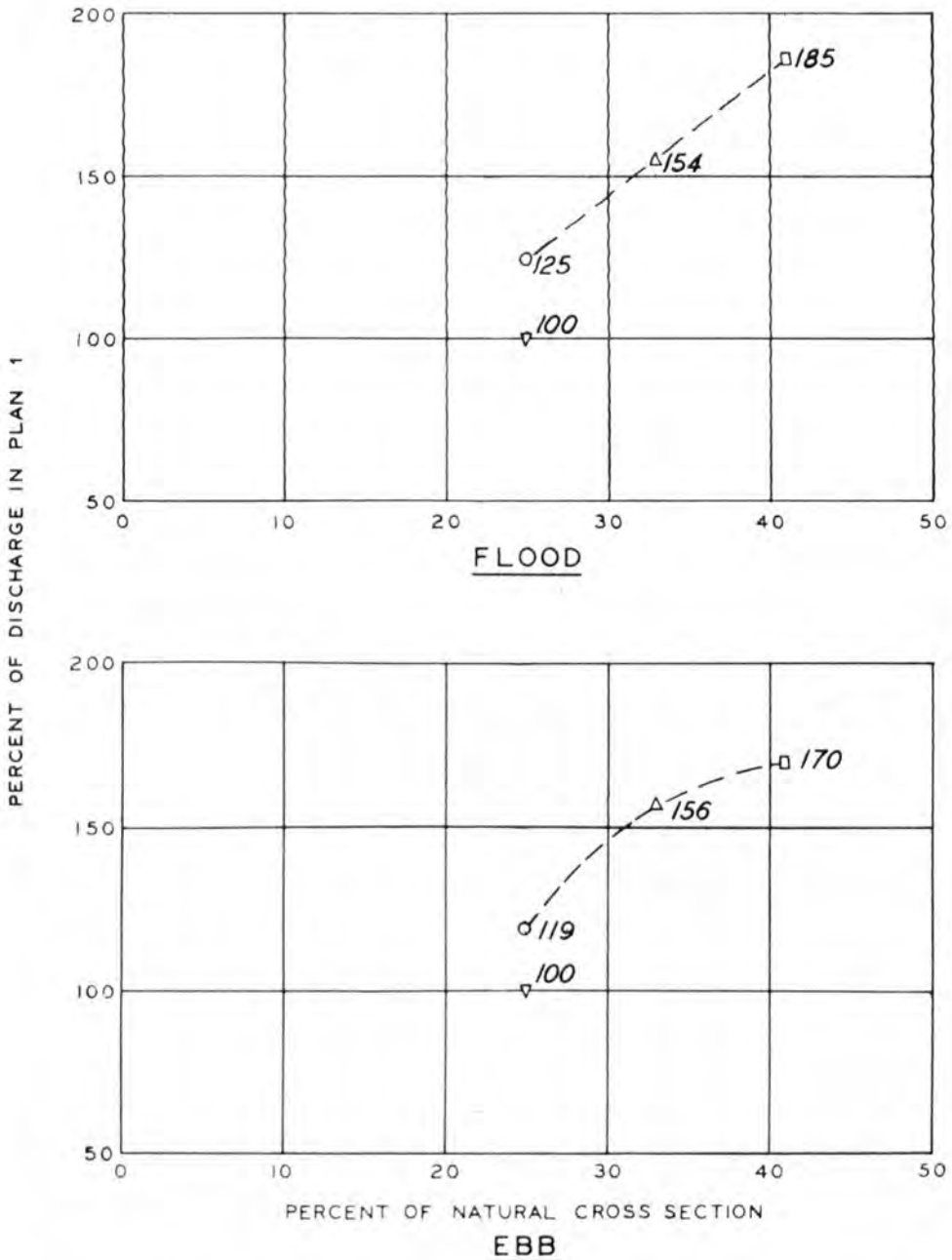

TREASURE ISLAND
RIGOLETS
MODEL LIMITS
LEGEND
TIDE GAGE
VELOCITY STATION
1.9 PROTOTYPE
2.0 MODEL
N
NOTE. VALUES ARE AVERAGES OF SURFACE, MID-DEPTH, AND BOTTOM IN FPS PROTOTYPE
W.S. EL. ARE REFERRED TO FT MSL. PROTOTYPE
W.S. EL
0.8 MODEL
0.8 PROTOTYPE
RANGE 6
RANGE 7
RANGE 5
RANGE 4
RANGE 3
RANGE 2
LAKE
PONTCHARTRAIN
HEADBAY
FORT PIKE
CANAL
SAWMILL PASS
FORT
PIKE
W.S. EL
1.1 MODEL
1.1 PROTOTYPE
LAKE ST CATHERINE
HEADBAY
VERIFICATION OF FLOOD VELOCITIES
SCALES IN FEET
PROTOTYPE 1000 0 1000 2000 3000
MODEL 10 0 10 20 30

PLATE 1

PLATE 2


TREASURE ISLAND
W.S. EL
0.4 MODEL
0.3 PROTOTYPE
RANGE C
RANGE B
RANGE A
RIGOLETS
RANGE 7
RANGE 6
RANGE 5
RANGE 3
RANGE 2
RANGE 4
MODEL LIMITS
LEGEND
TIDE GAGE
VELOCITY STATION
1.9 PROTOTYPE
2.0 MODEL
NOTE VALUES ARE AVERAGES OF SURFACE, MID-DEPTH, AND BOTTOM IN FPS PROTOTYPE
W.S. EL ARE REFERRED TO FT MSL PROTOTYPE
N
LAKE
PONTCHARTRAIN
HEADBAY
FORT PIKE
FORT PIKE CANAL
SAMMILL PASS
LAKE ST. CATHERINE
W.S. EL
0.3 MODEL
0.2 PROTOTYPE
W.S. EL
0.0 MODEL
-0.1 PROTOTYPE
VERIFICATION OF
EBB VELOCITIES
SCALES IN FEET
PROTOTYPE 1000 0 1000 2000 3000
MODEL 10 0 10 20 30



LEGEND

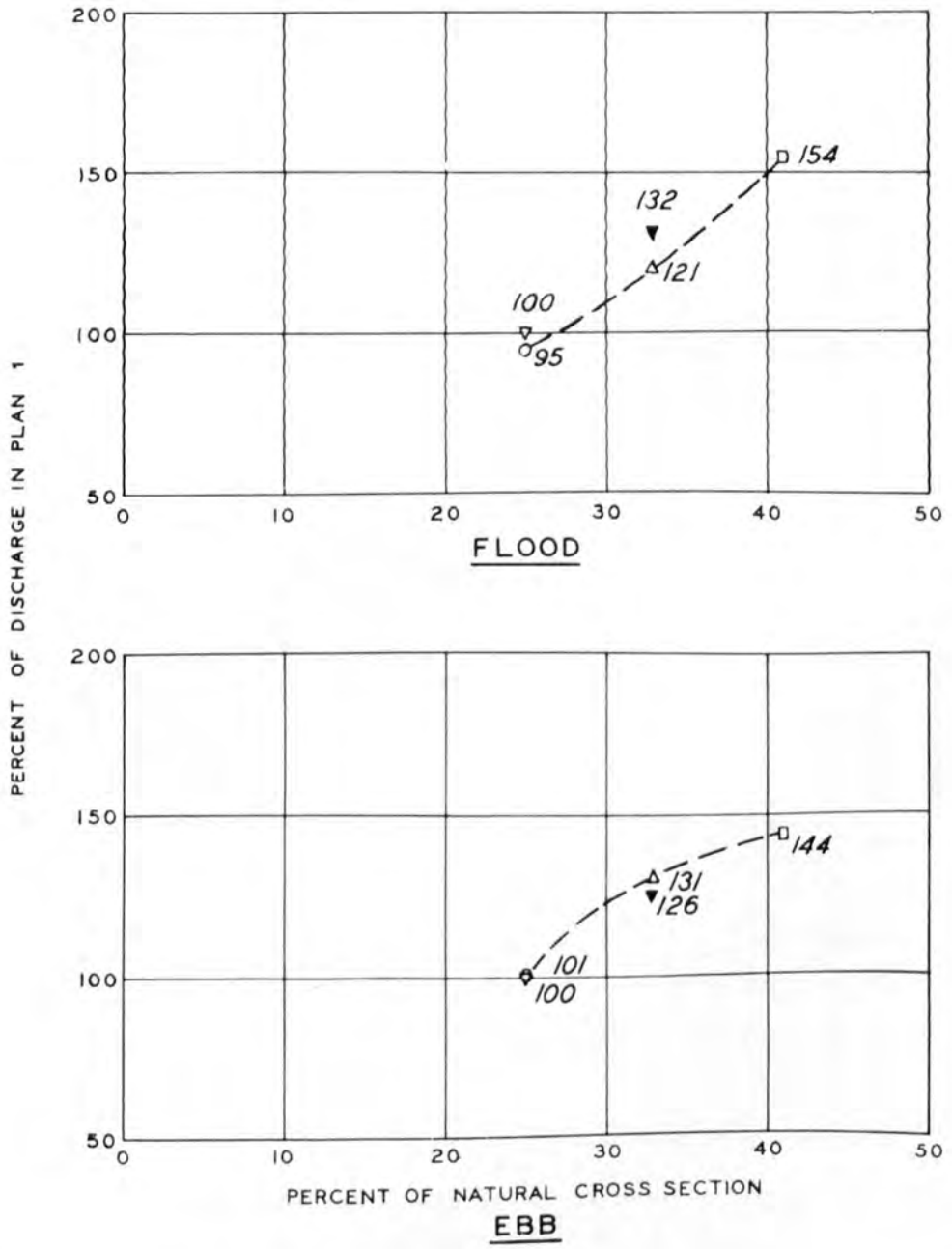
- ▽ PLAN 1
- O PLAN 2
- △ PLAN 2A
- □ PLAN 2B

DISCHARGE CAPABILITY

RIGOLETS PASS

HEADWATER ELEVATION: 0.0 FT MSL

PLATE 3

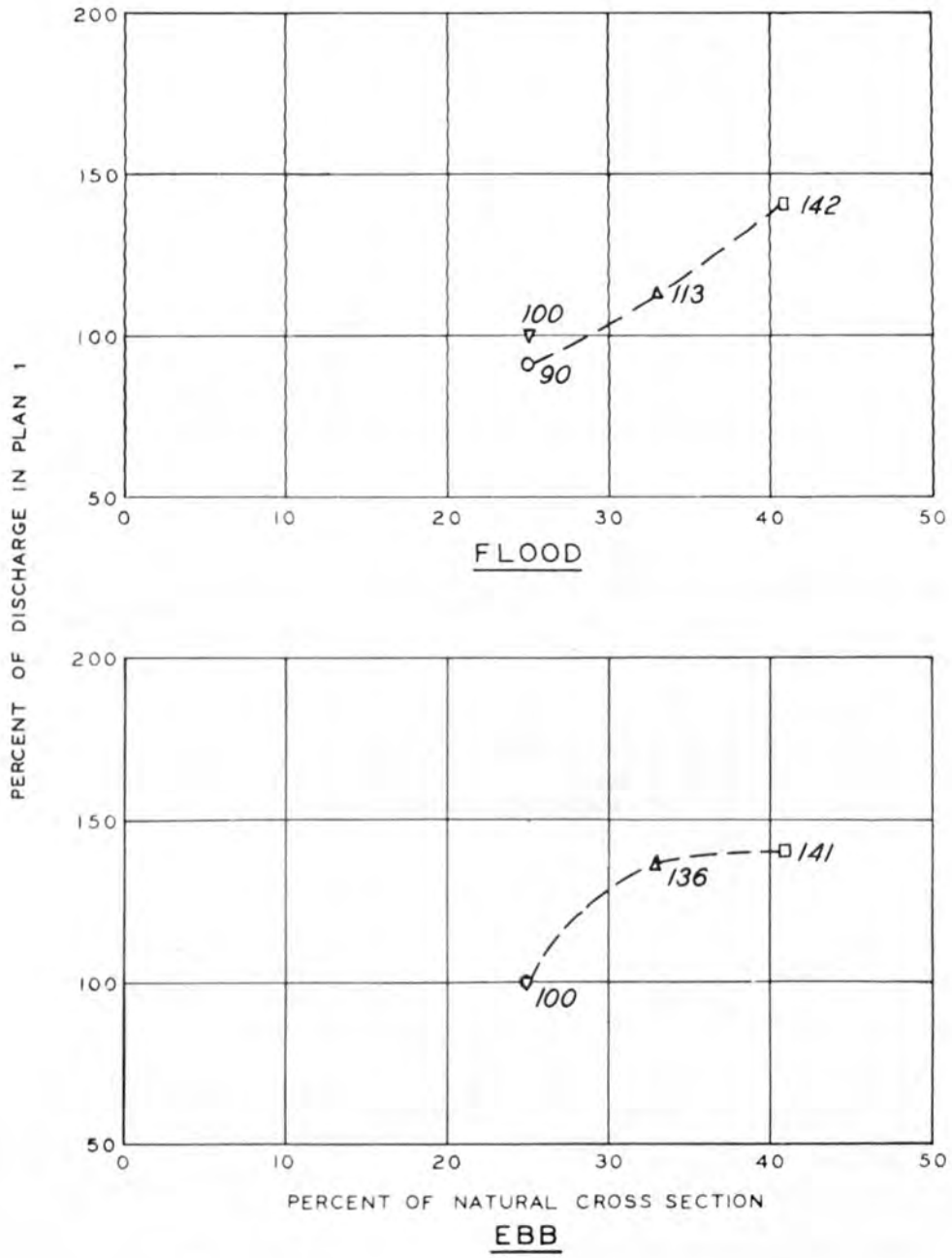


LEGEND

- ▽ PLAN 1
- ○ PLAN 2
- △ PLAN 2A
- □ PLAN 2B
- ▼ PLAN 2A-1

DISCHARGE CAPABILITY
RIGOLETS PASS
HEADWATER ELEVATION: 1.0 FT MSL

PLATE 4



LEGEND

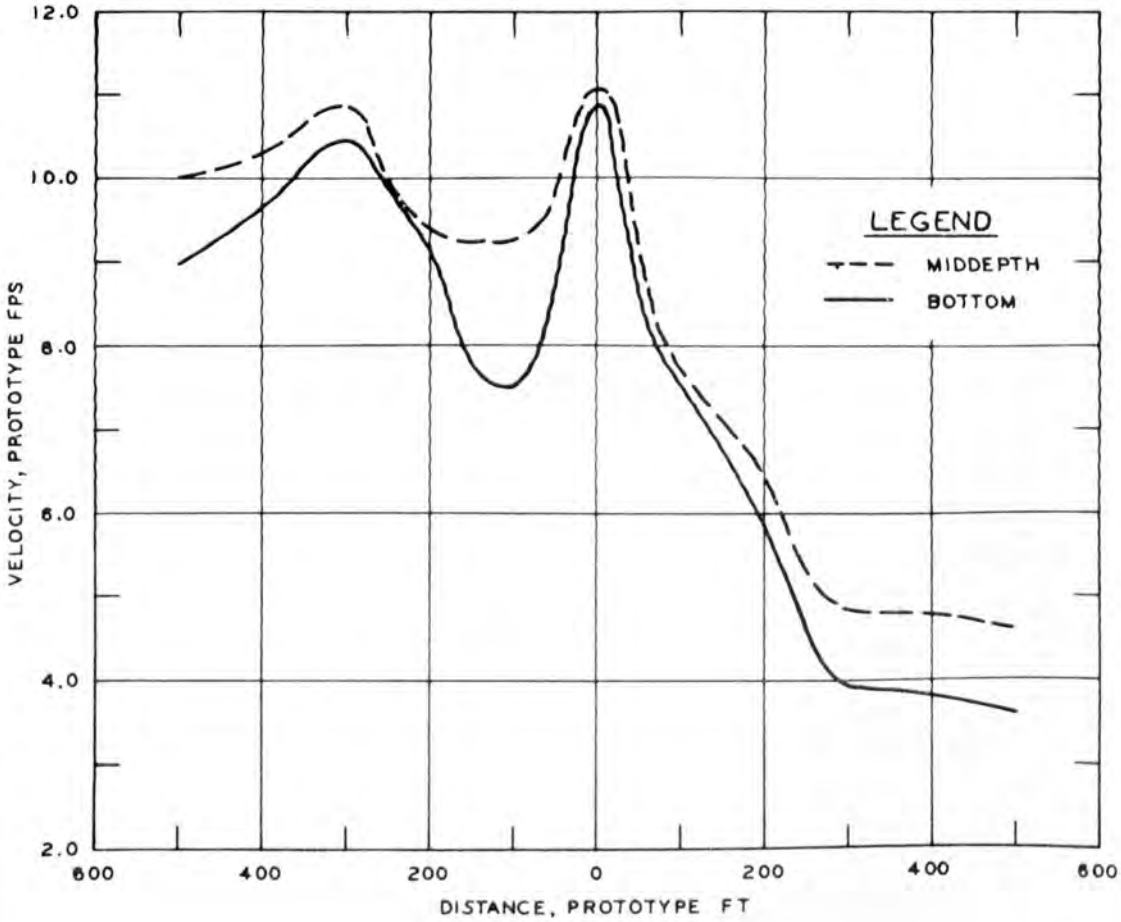
- ▽ PLAN 1
- O PLAN 2
- △ PLAN 2A
- □ PLAN 2B

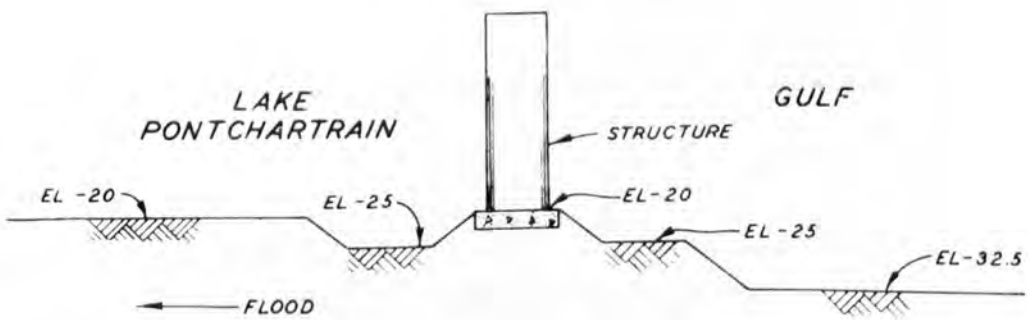
DISCHARGE CAPABILITY

RIGOLETS PASS

HEADWATER ELEVATION: 2.0 FT MSL

PLATE 5



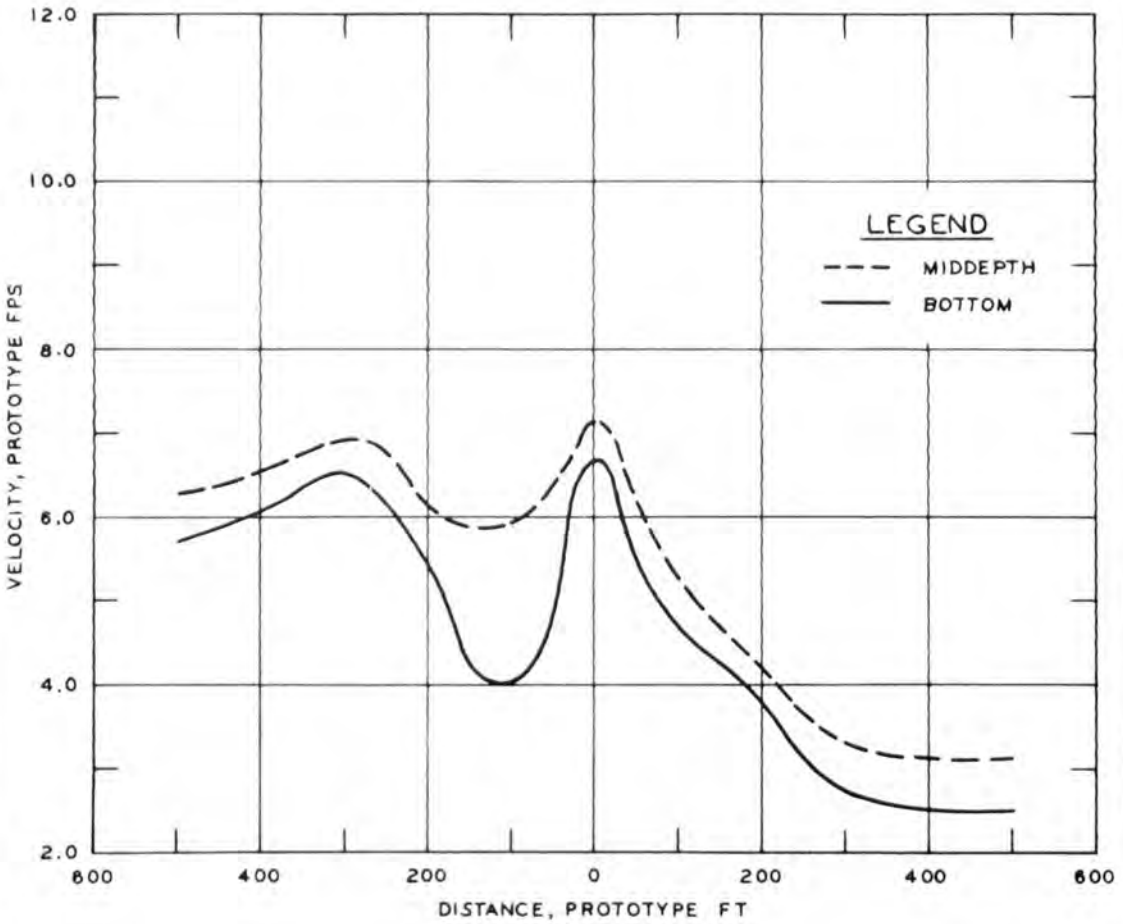


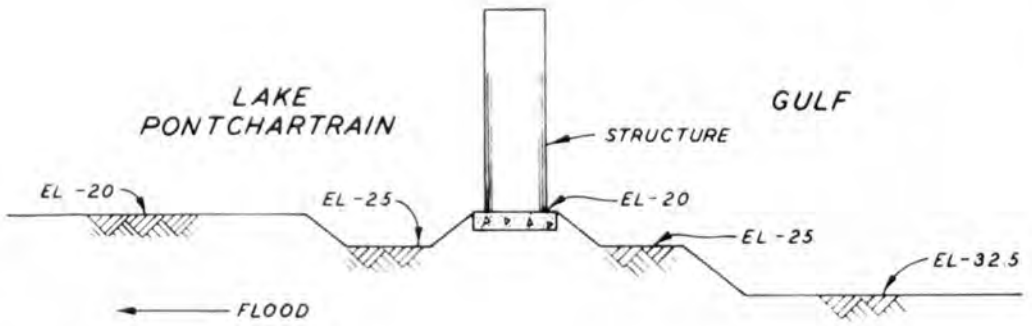
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 1

FLOOD FLOW A= 216,000 CFS

PLATE 6



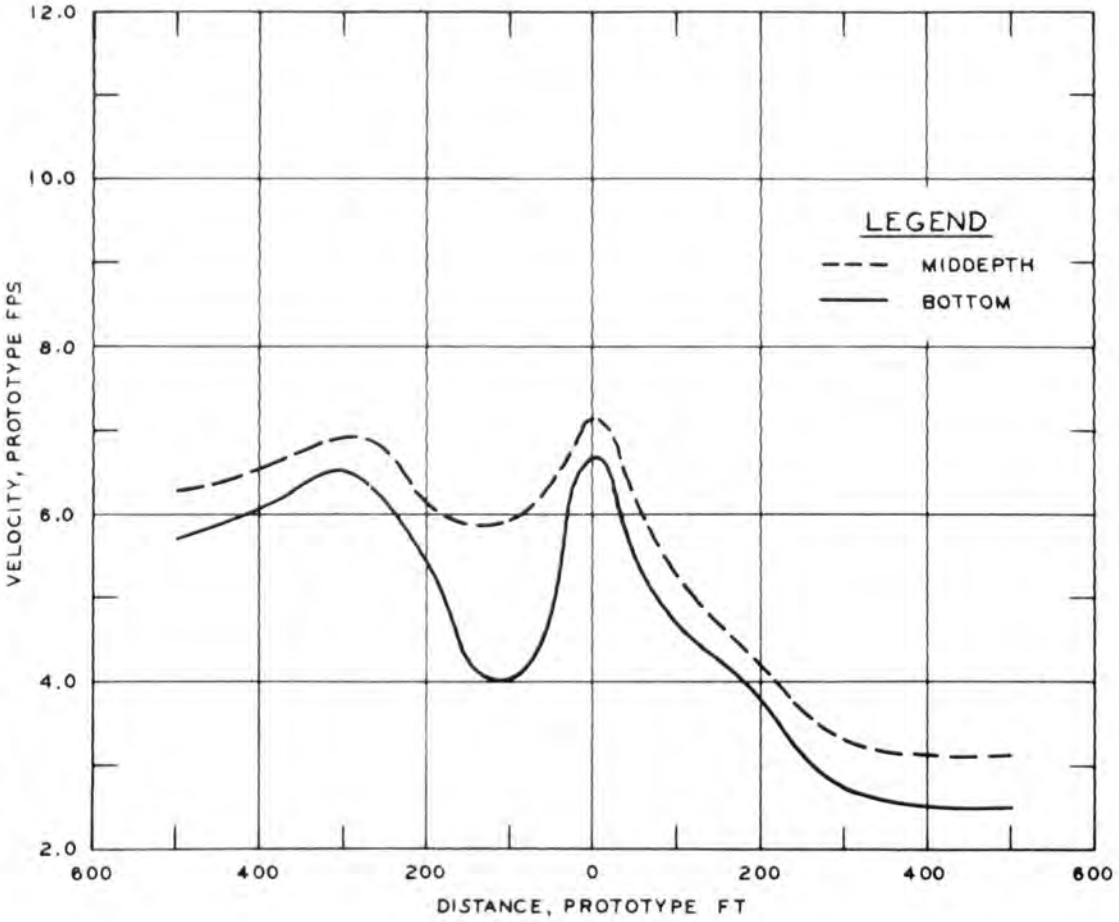


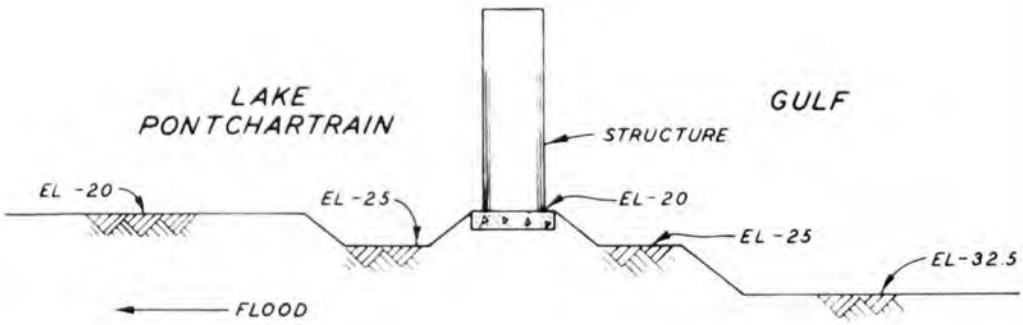
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN I

FLOOD FLOW C = 143,000 CFS

PLATE 7



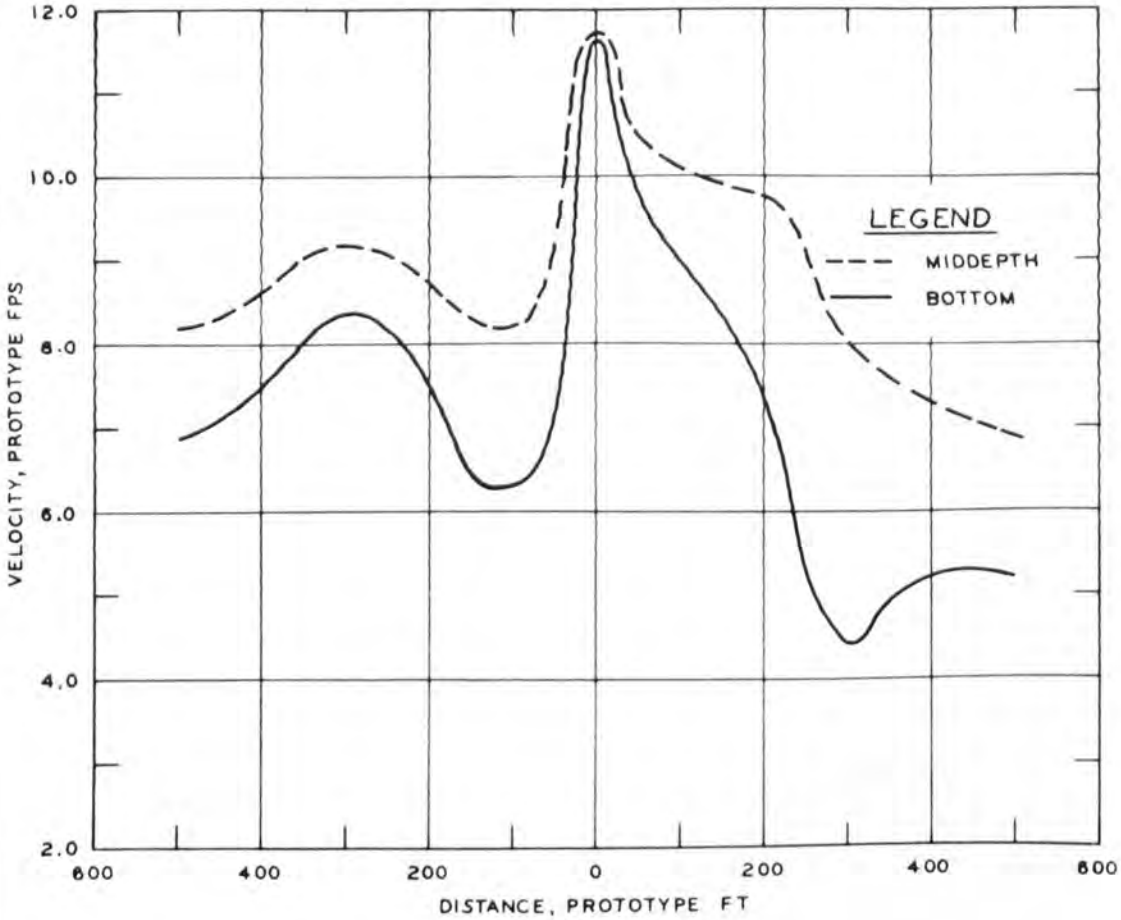


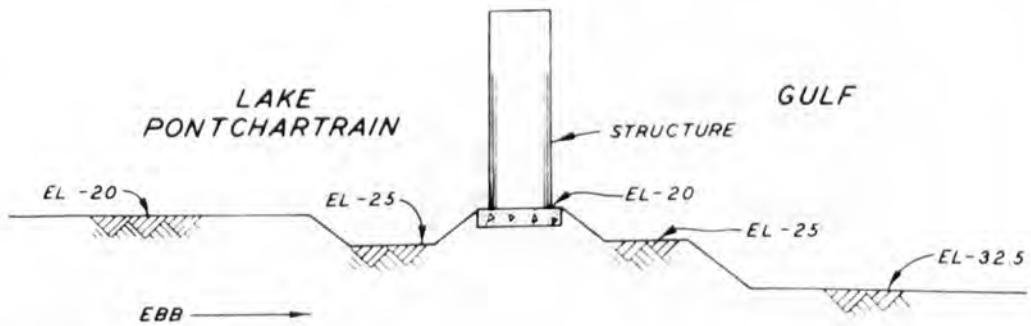
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 1

FLOOD FLOW C = 143,000 CFS

PLATE 7



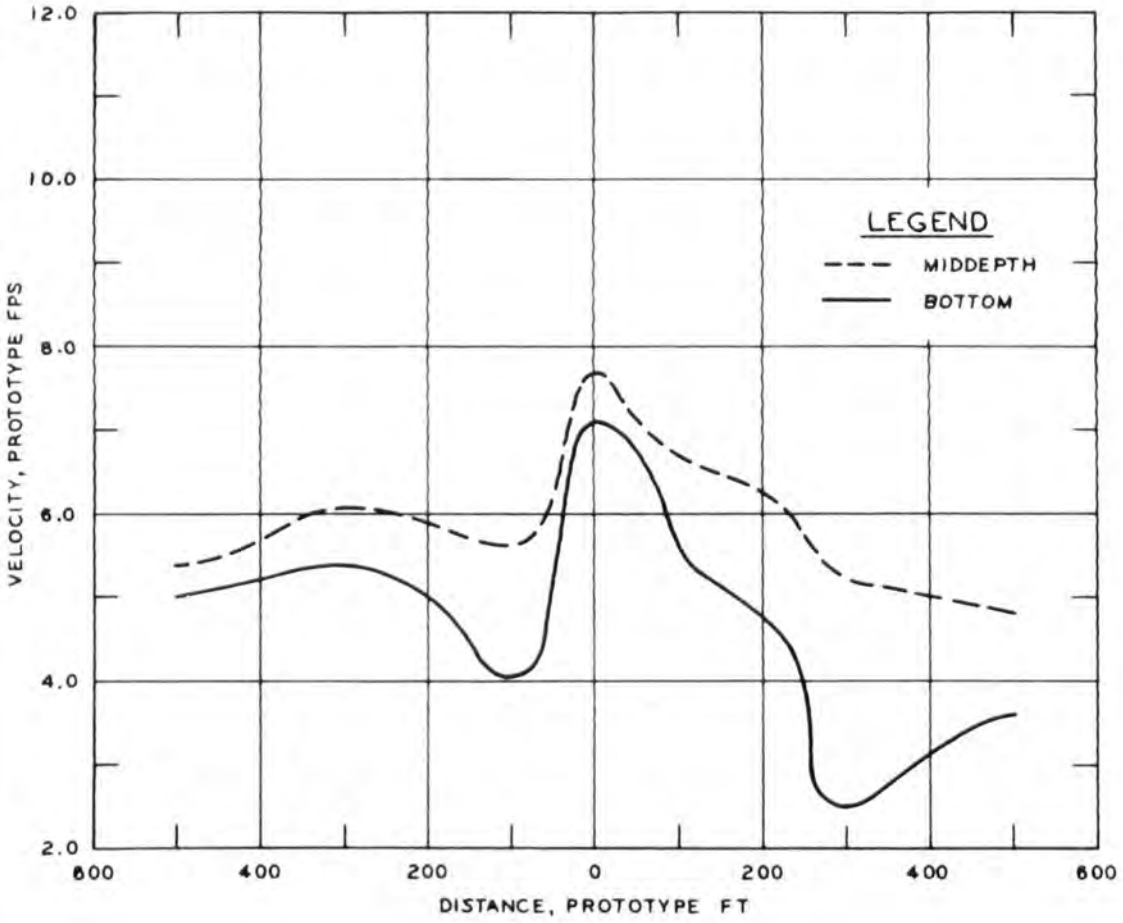


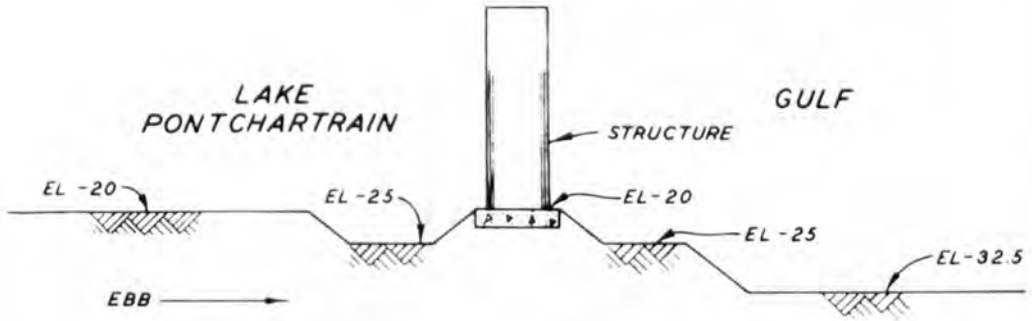
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 1

EBB FLOW A= 223,000 CFS

PLATE 8



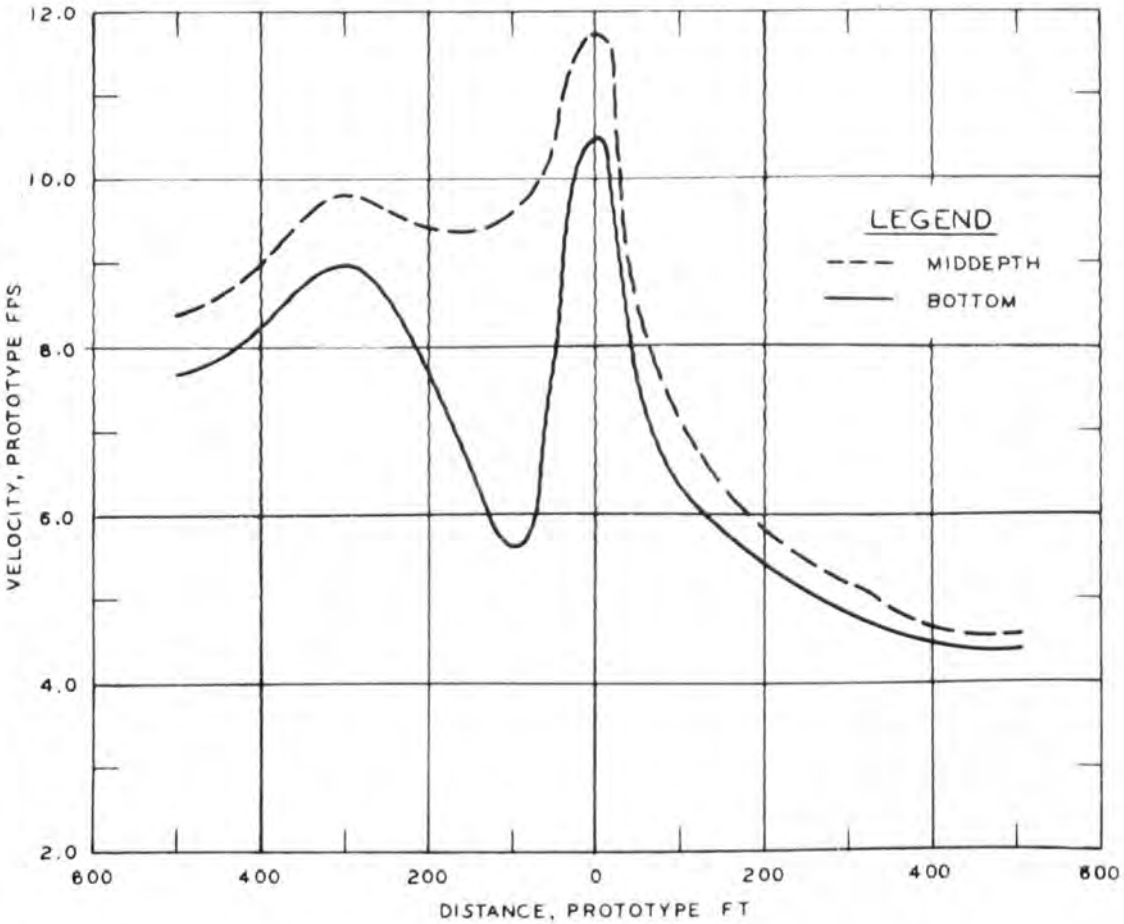


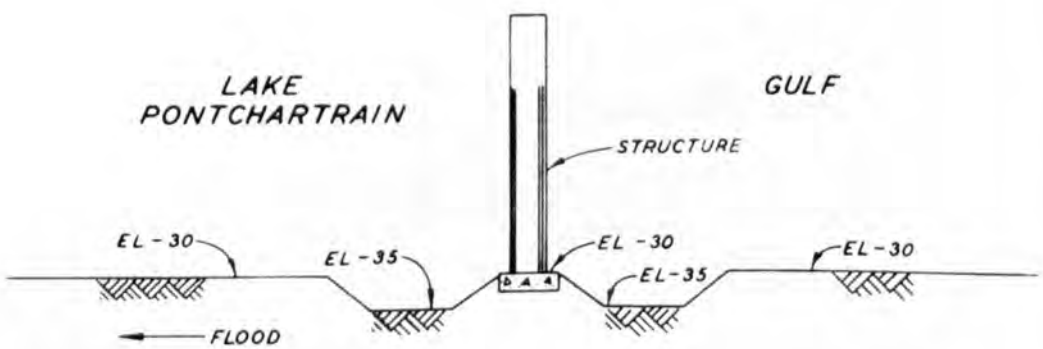
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 1

EBB FLOW C= 143,000 CFS

PLATE 9



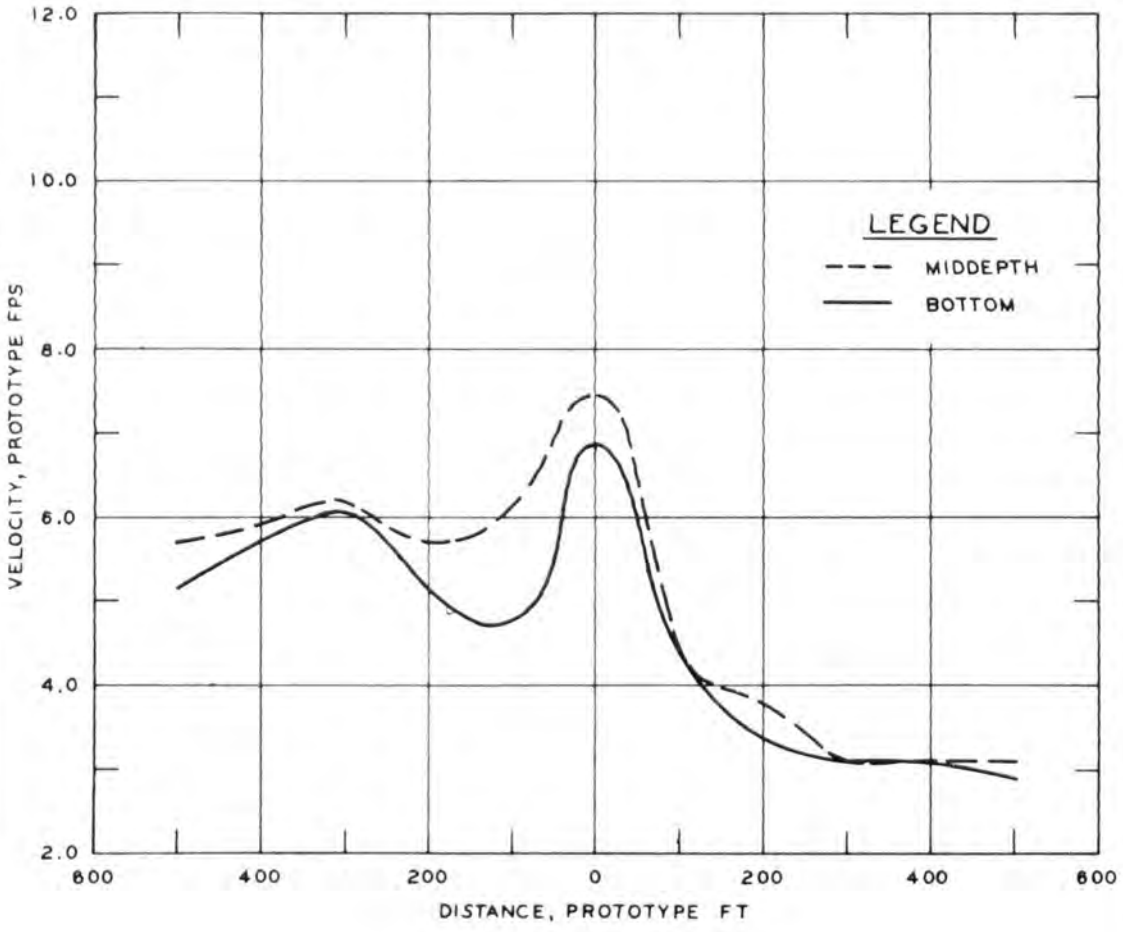


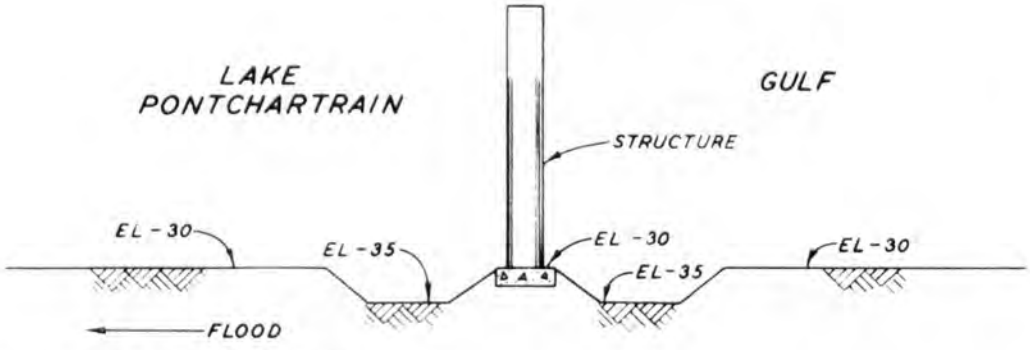
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2

FLOOD FLOW A = 216,000 CFS

PLATE 10



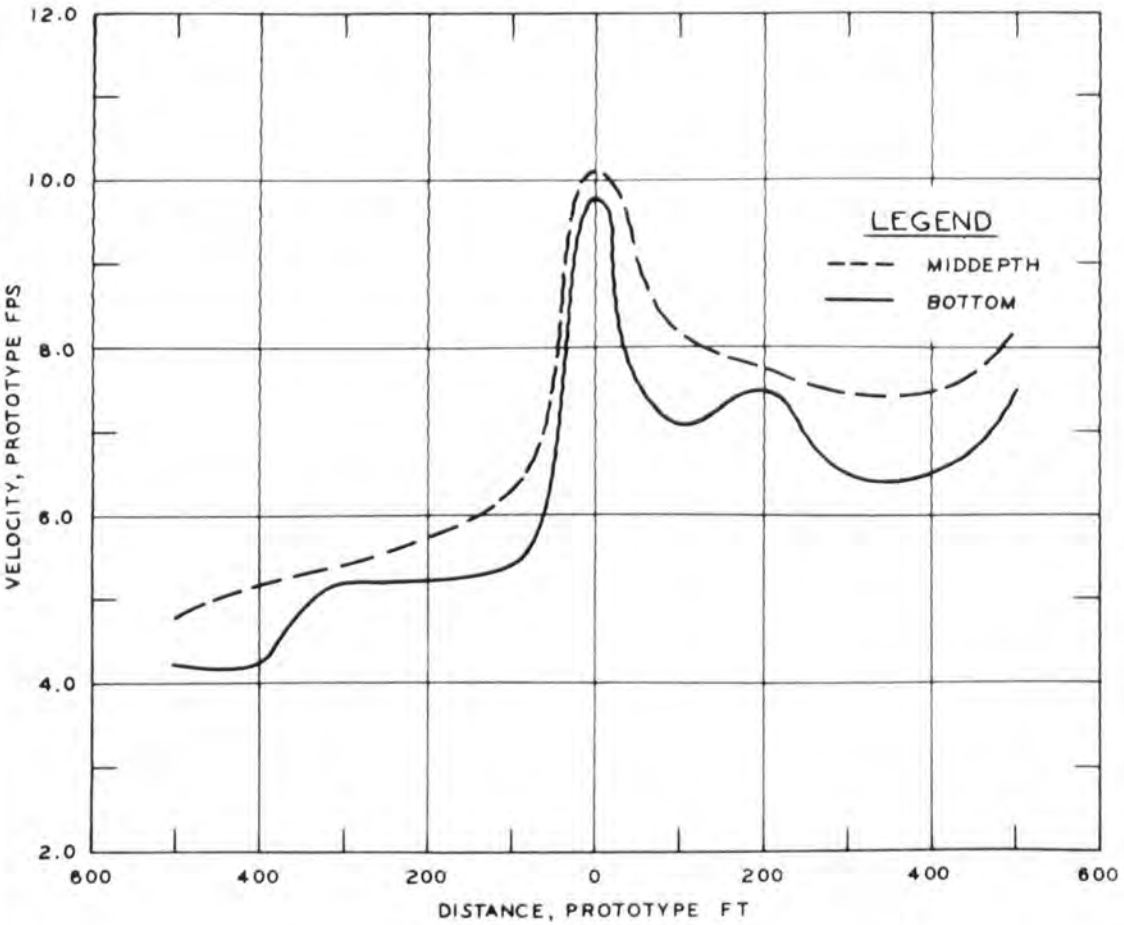


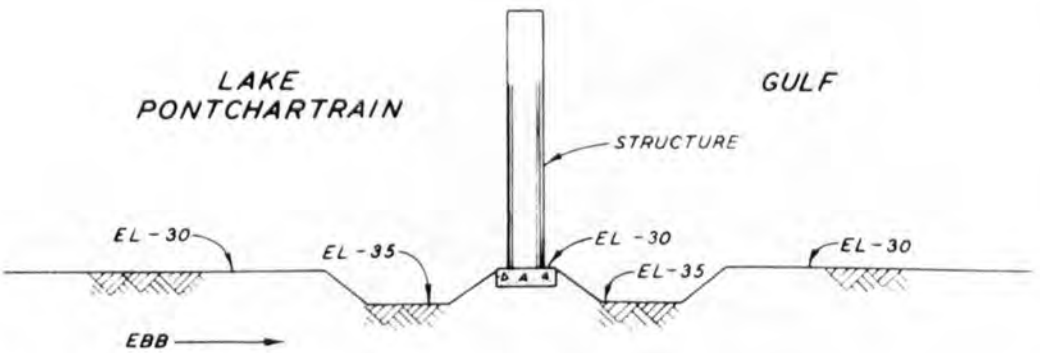
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2

FLOOD FLOW C = 143,000 CFS

PLATE 11



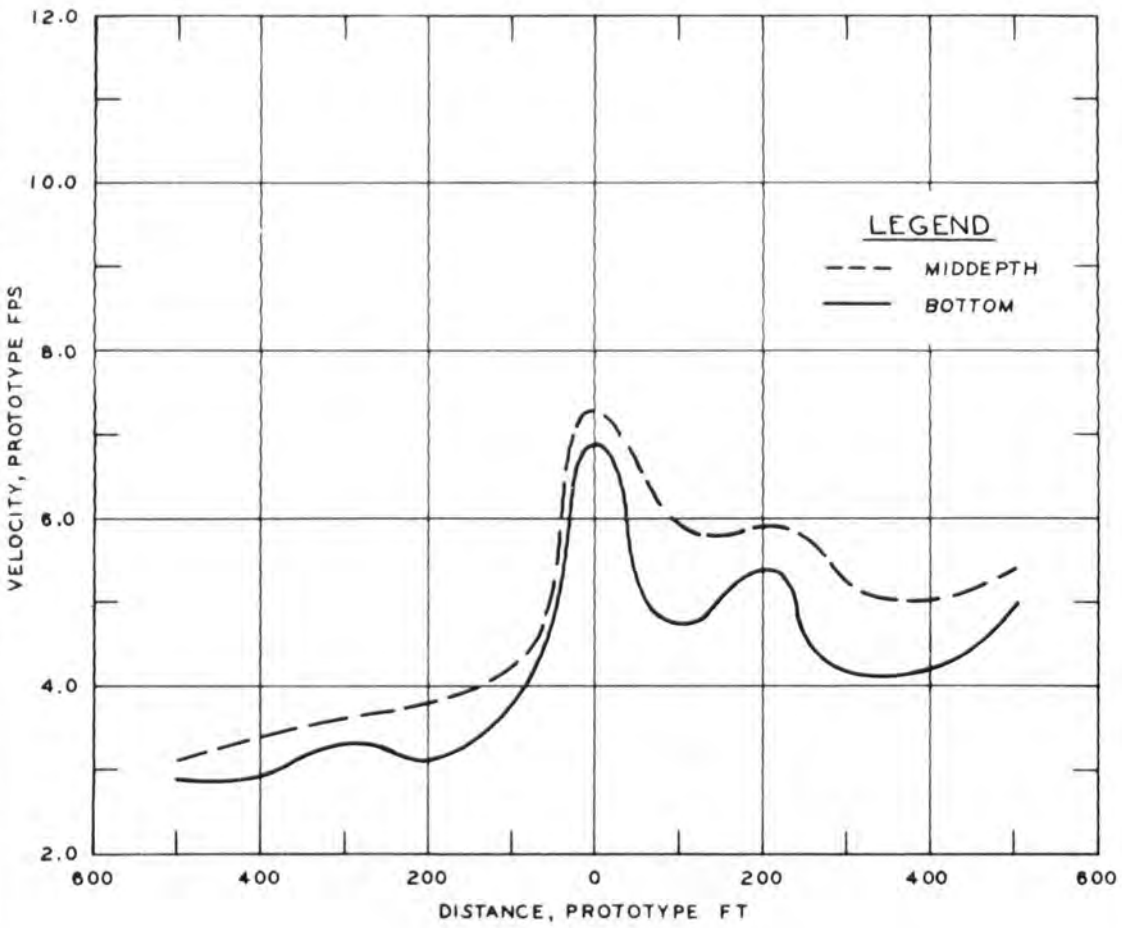


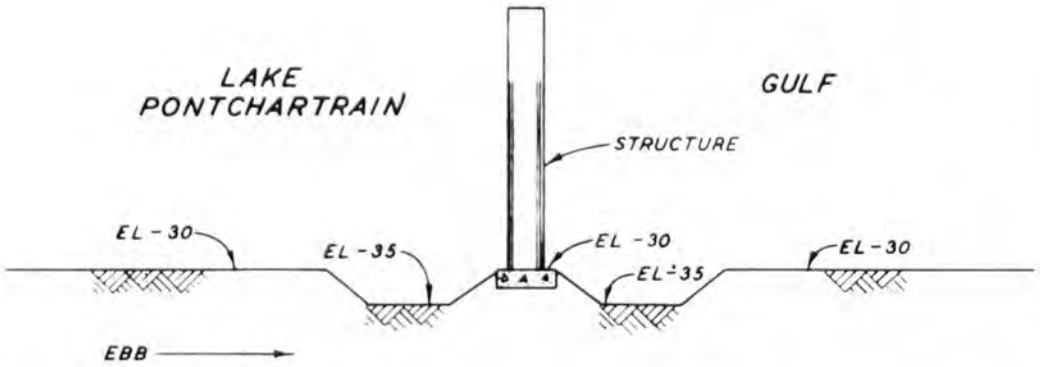
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2

EBB FLOW A= 223,000 CFS

PLATE 12



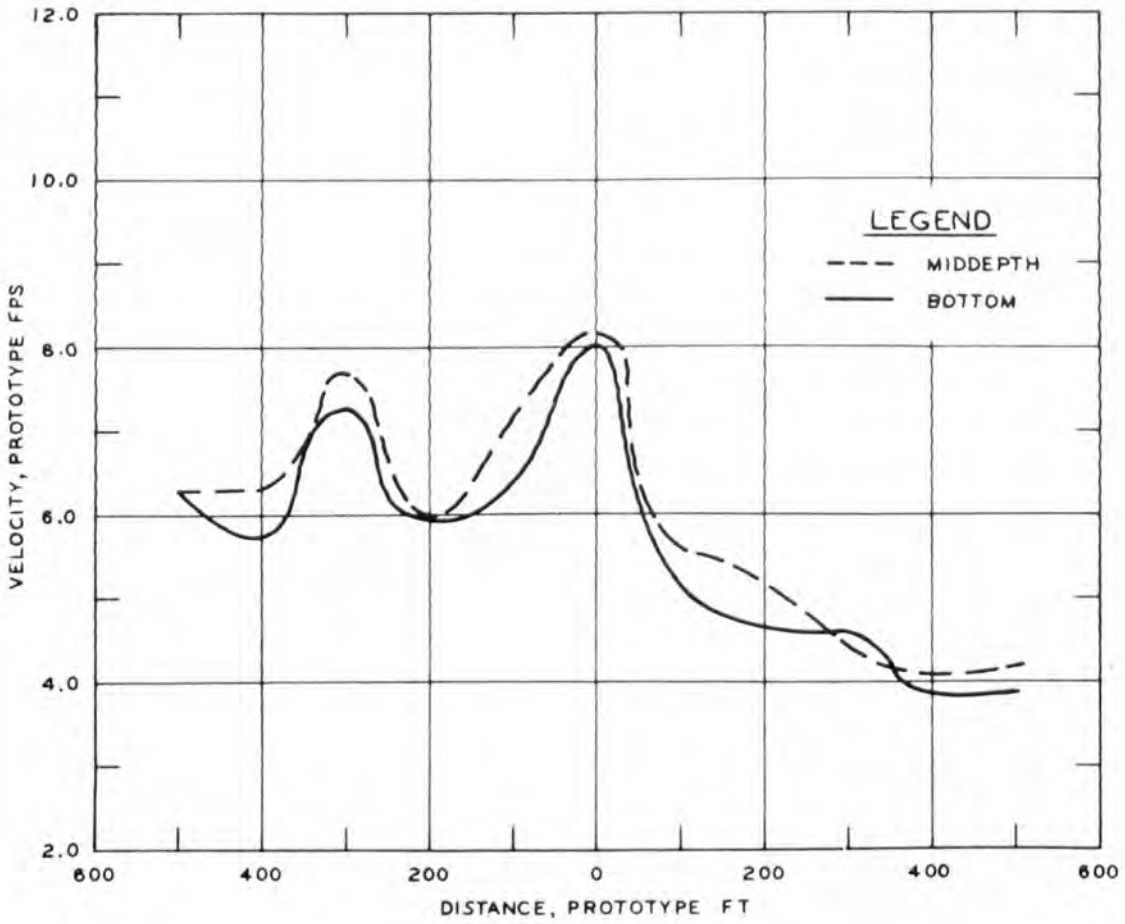


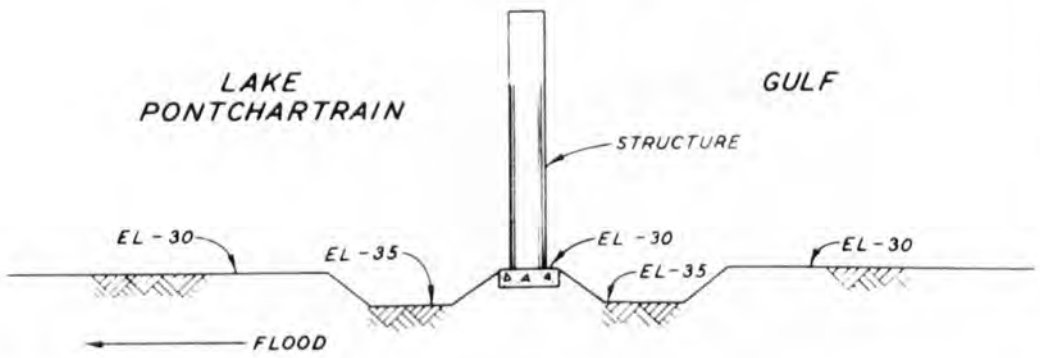
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2

EBB FLOW C= 143,000 CFS

PLATE 13



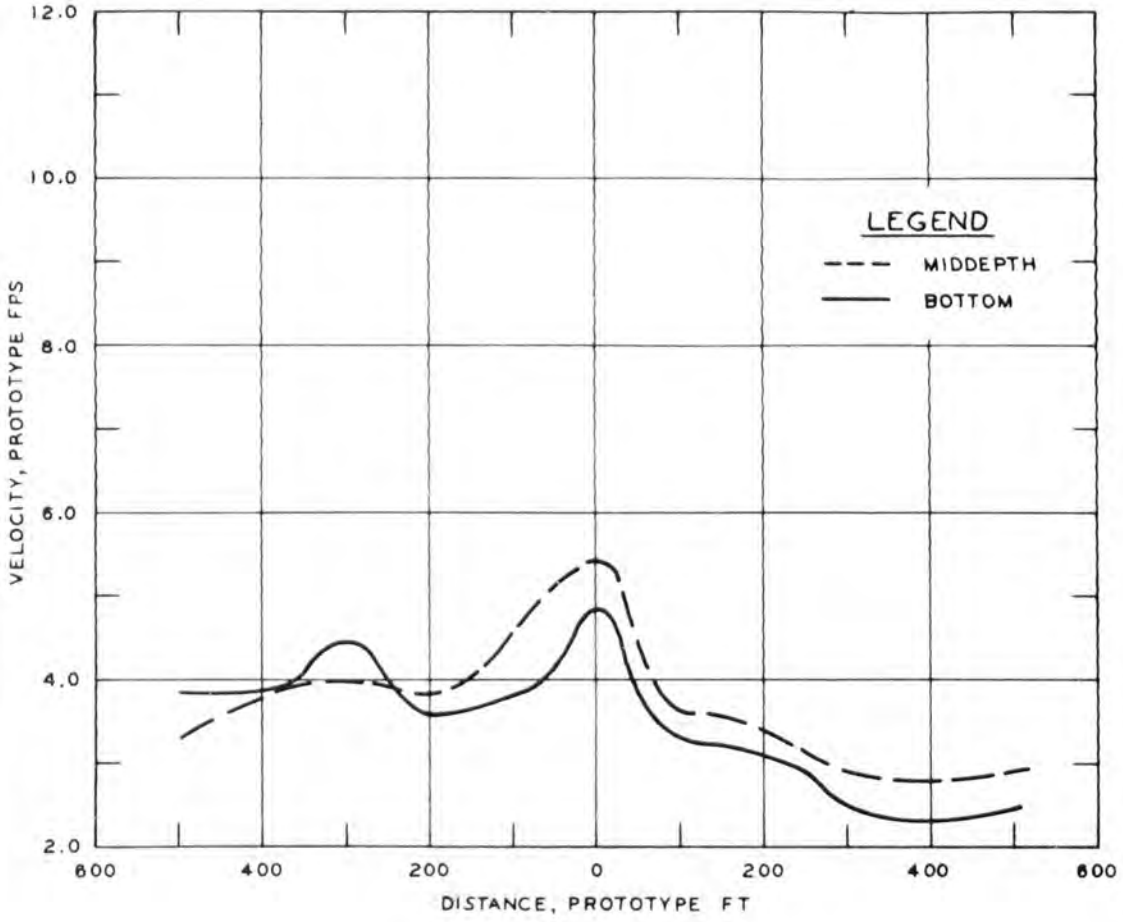


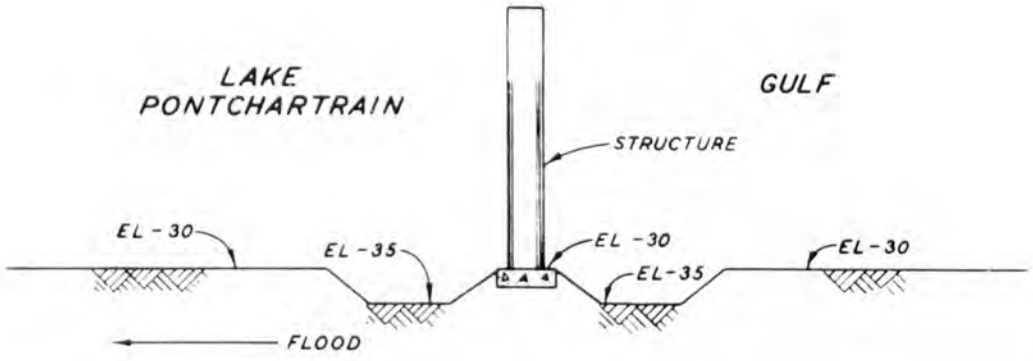
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A

FLOOD FLOW A= 216,000 CFS

PLATE 14



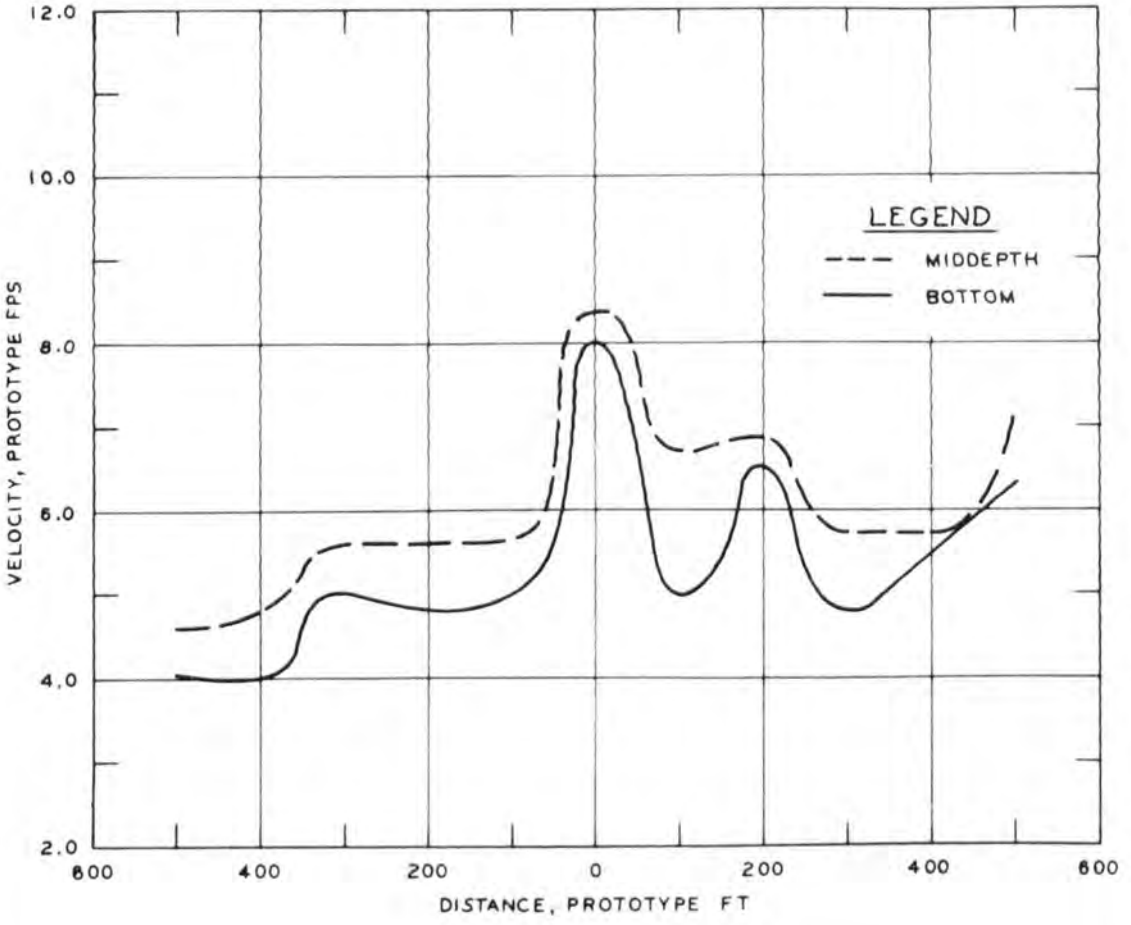


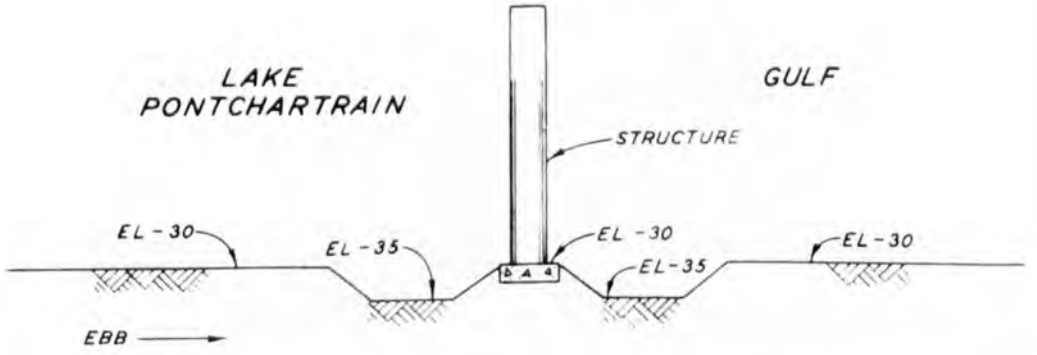
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A

FLOOD FLOW C= 143,000 CFS

PLATE 15



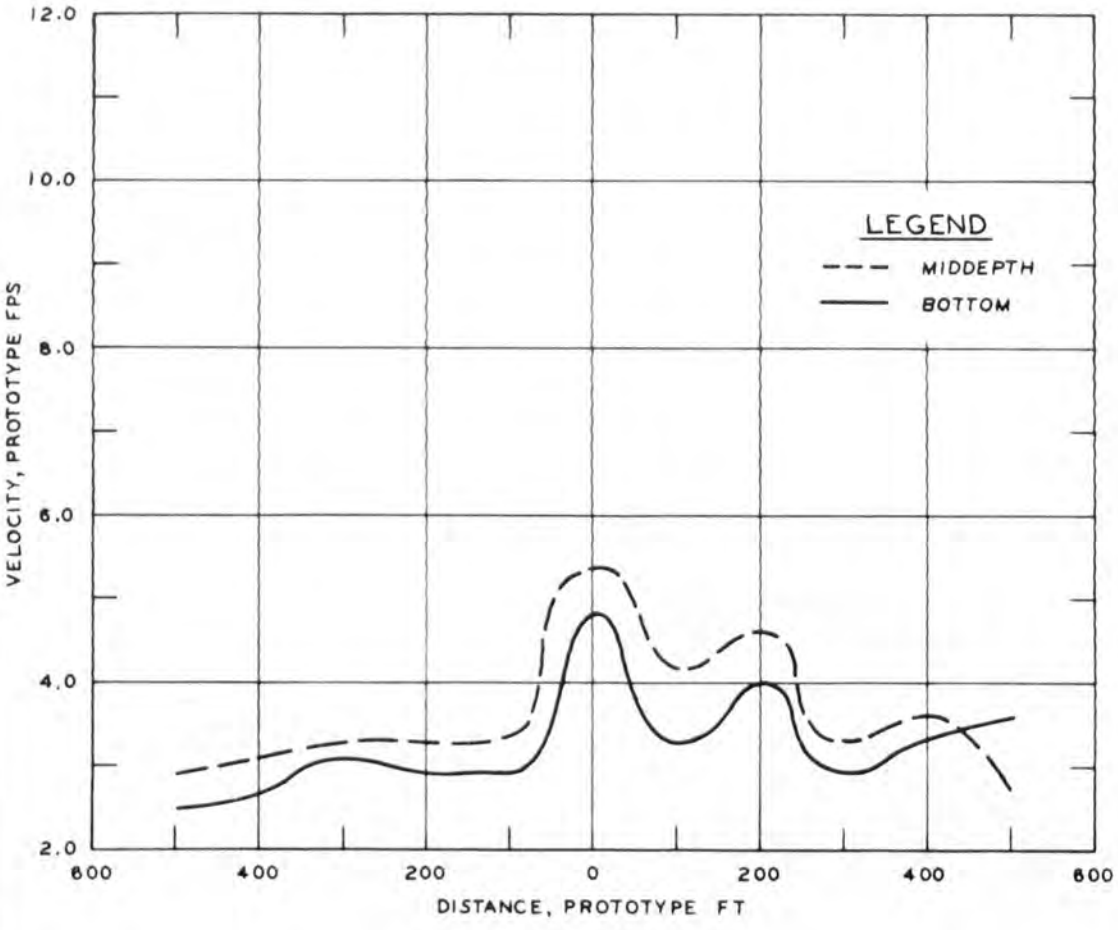


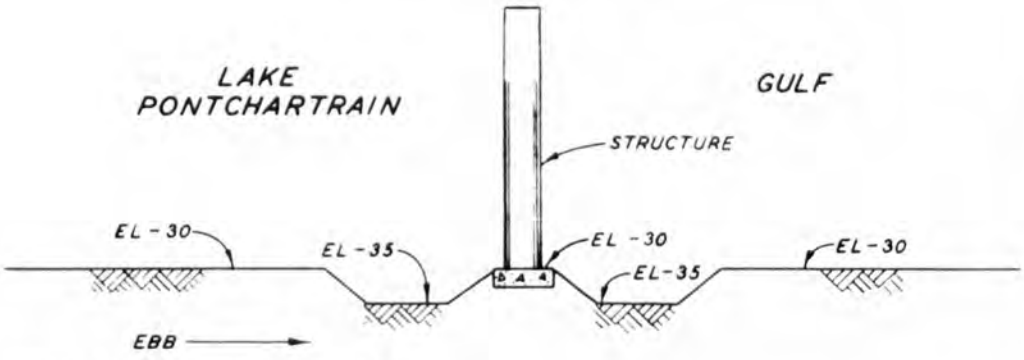
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A

EBB FLOW A= 223,000 CFS

PLATE 16



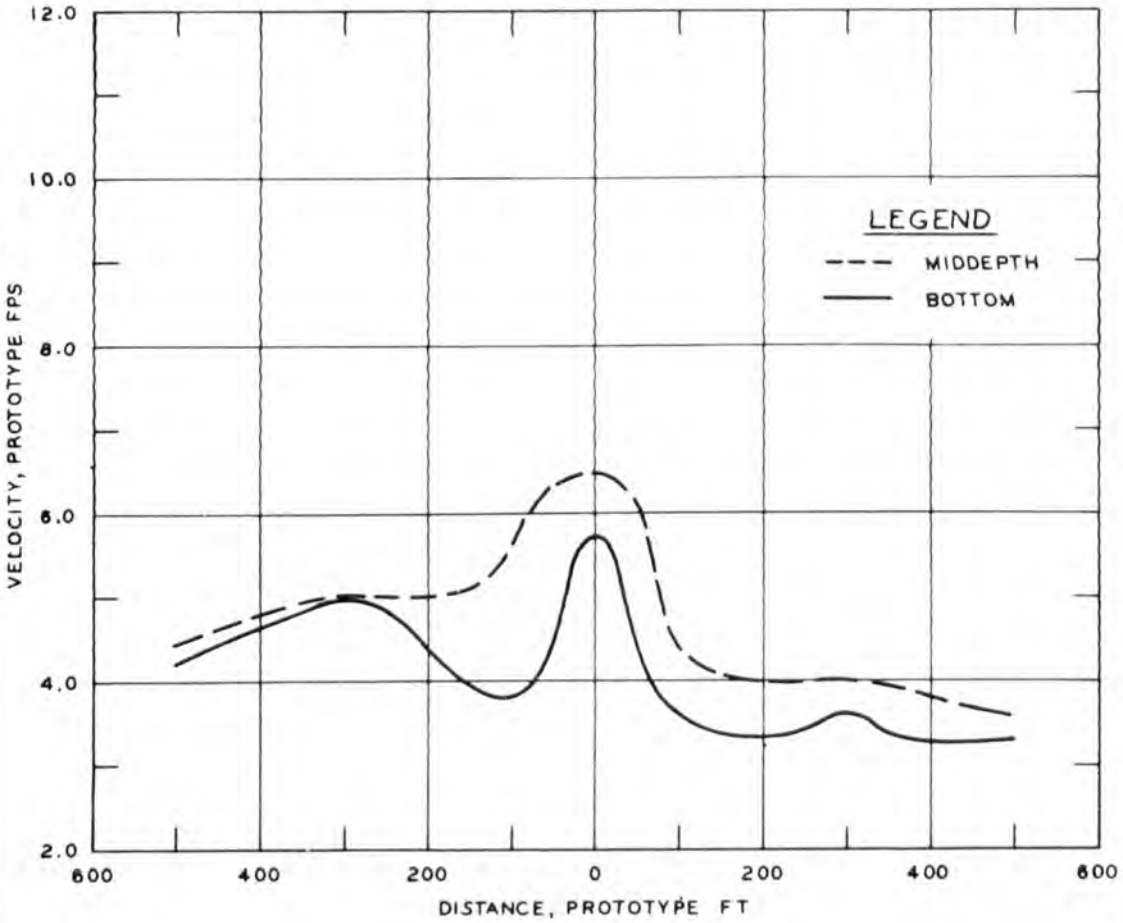


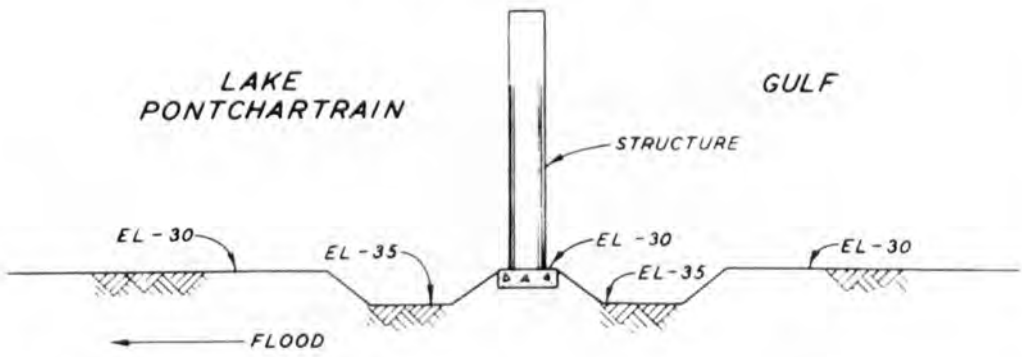
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A

EBB FLOW C= 143,000 CFS

PLATE 17



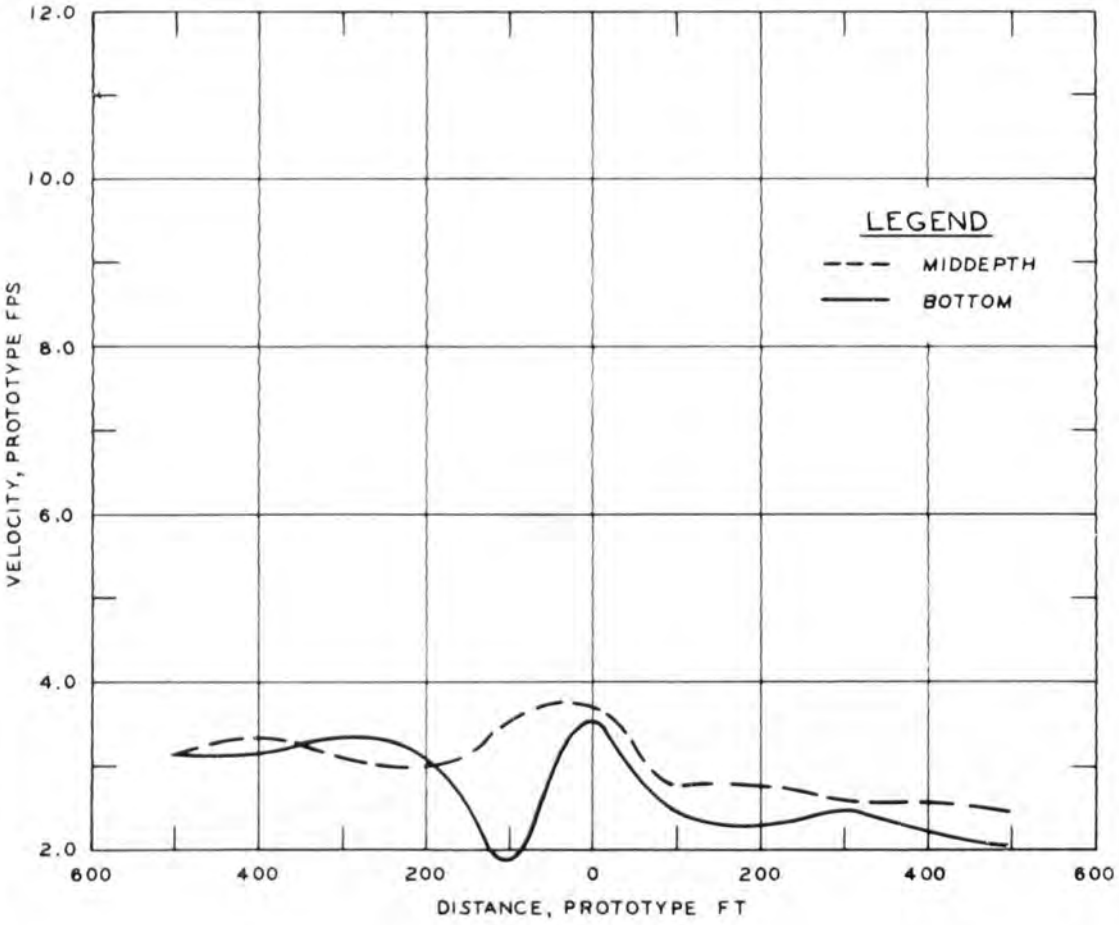


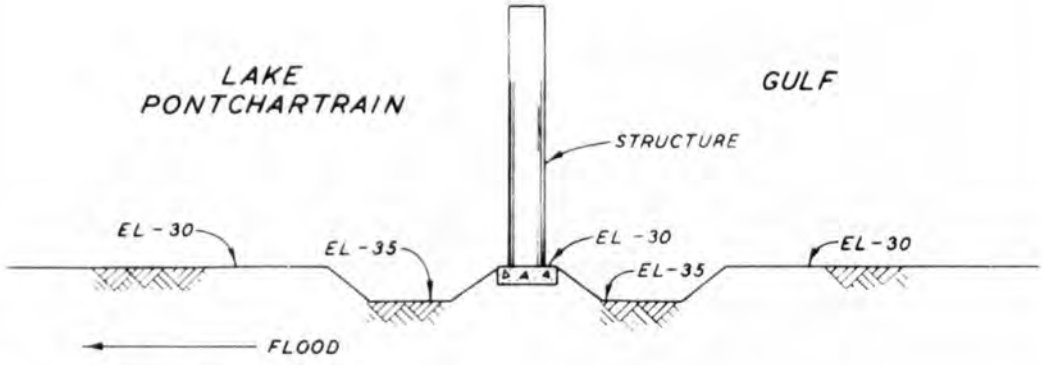
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2B

FLOOD FLOW A= 216,000 CFS

PLATE 18



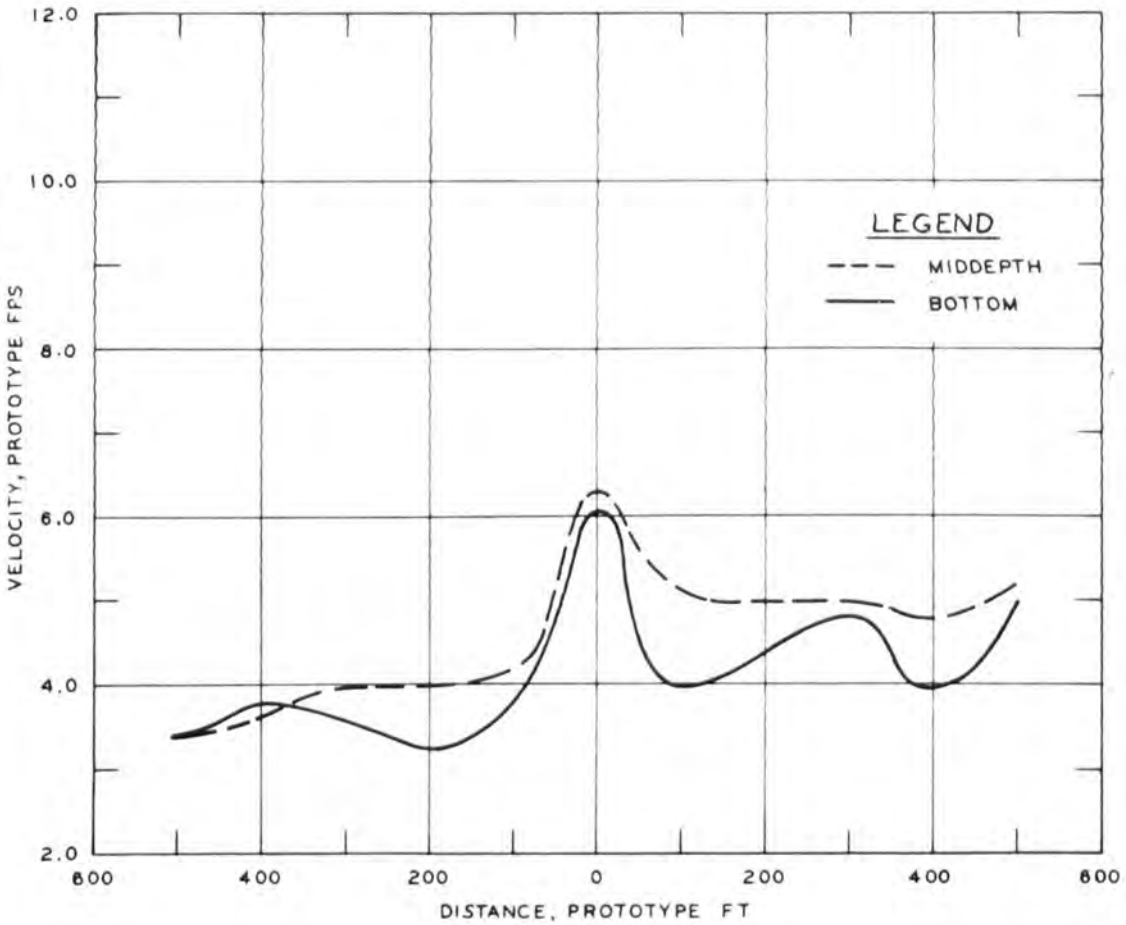


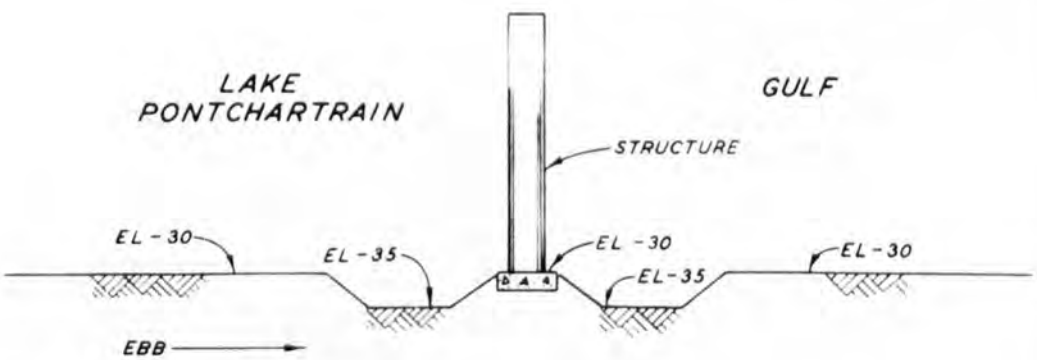
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2B

FLOOD FLOW C= 143,000 CFS

PLATE 19



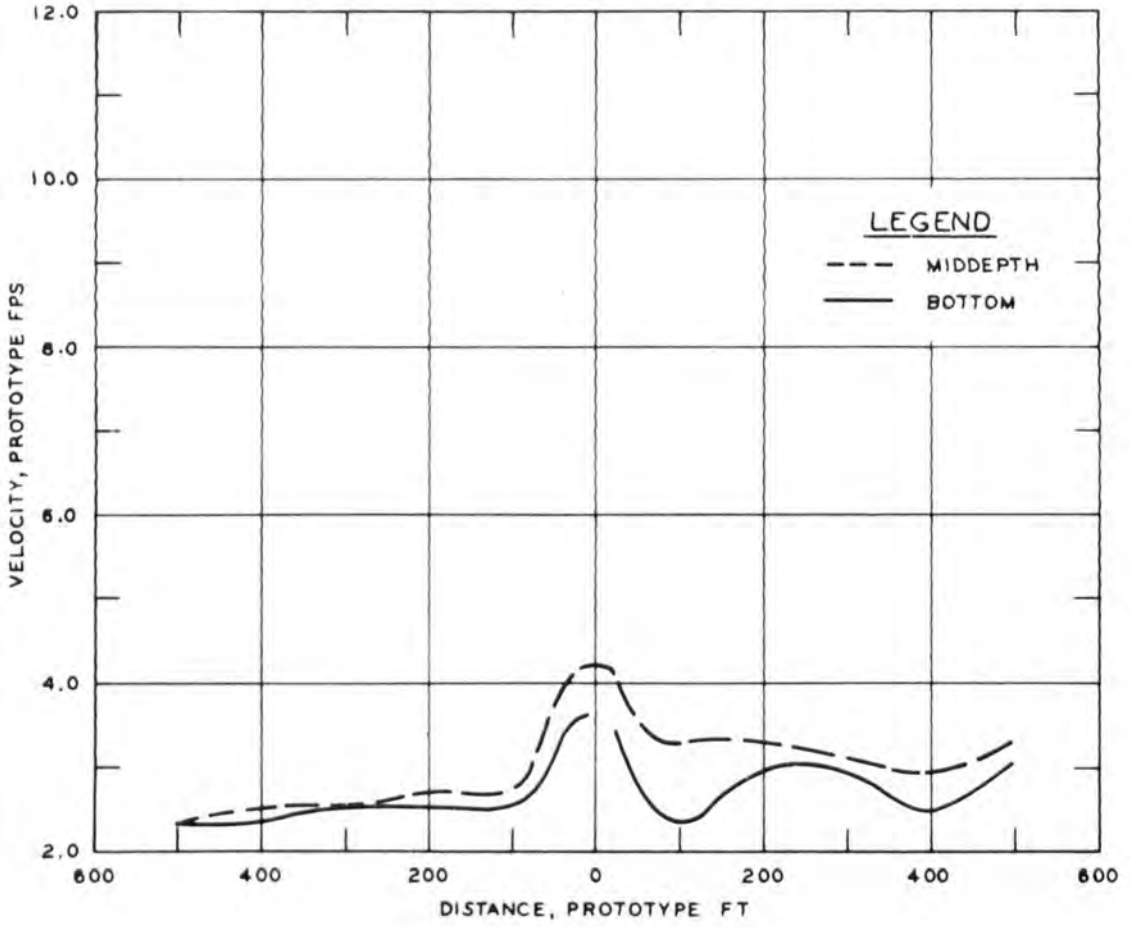


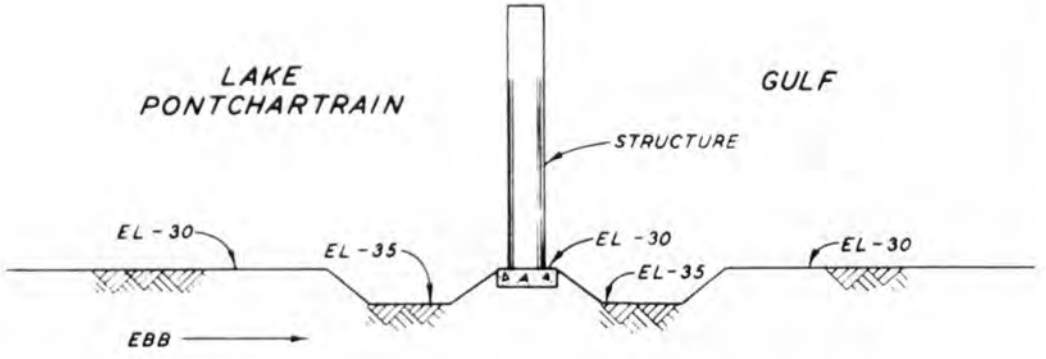
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2B

EBB FLOW A = 223,000 CFS

PLATE 20



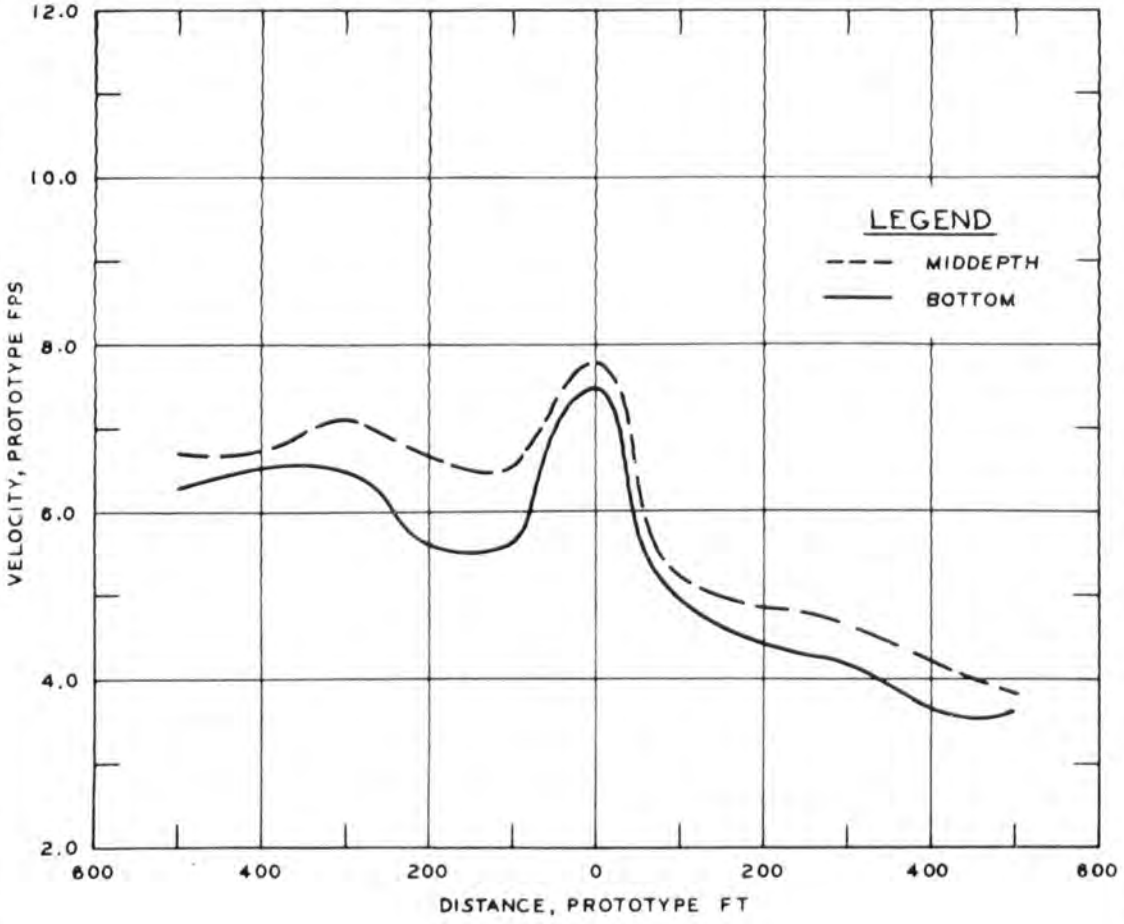


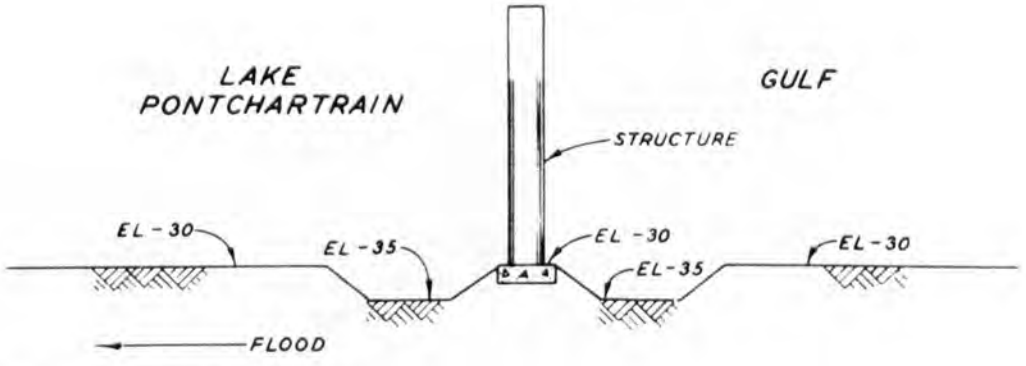
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2B

EBB FLOW C= 143,000 CFS

PLATE 21



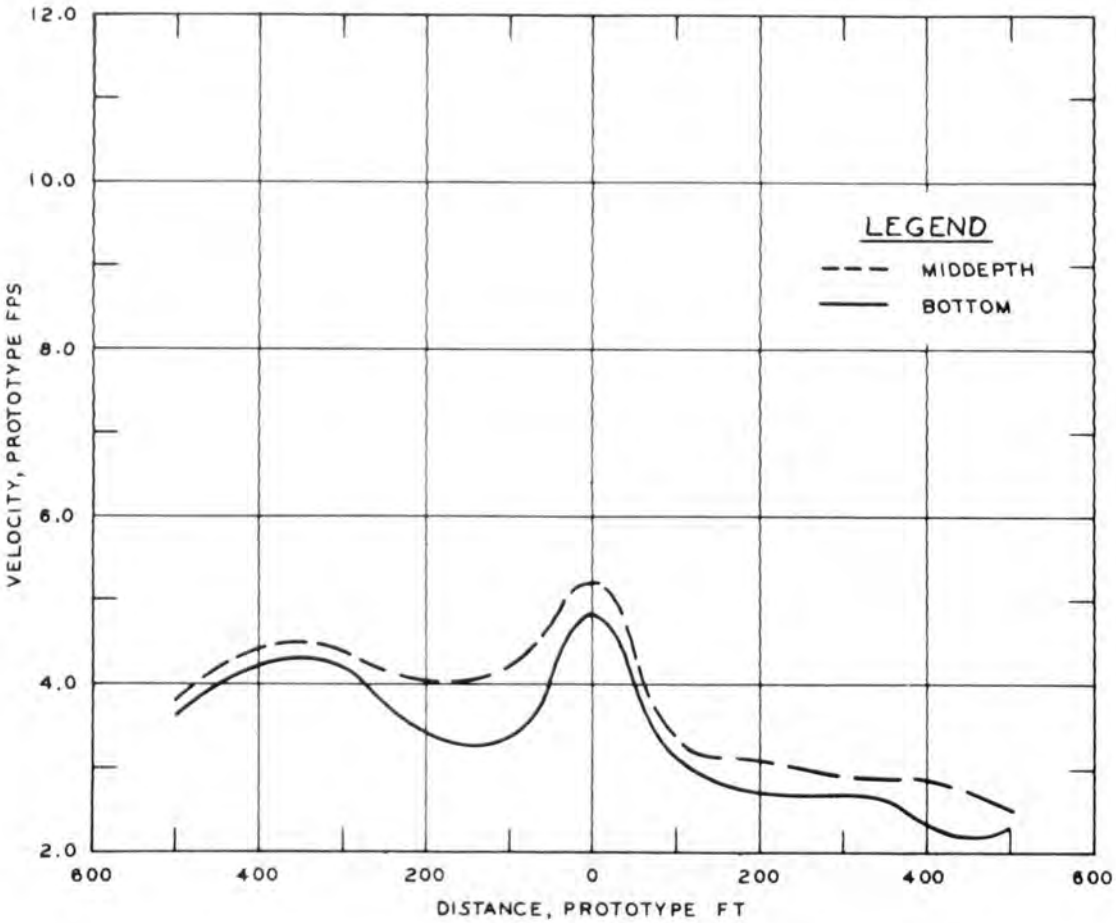


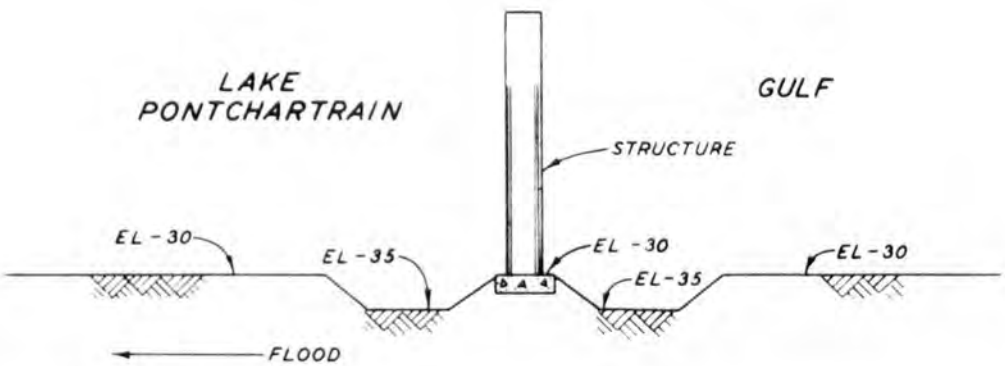
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A-1

FLOOD FLOW A= 216,000 CFS

PLATE 22



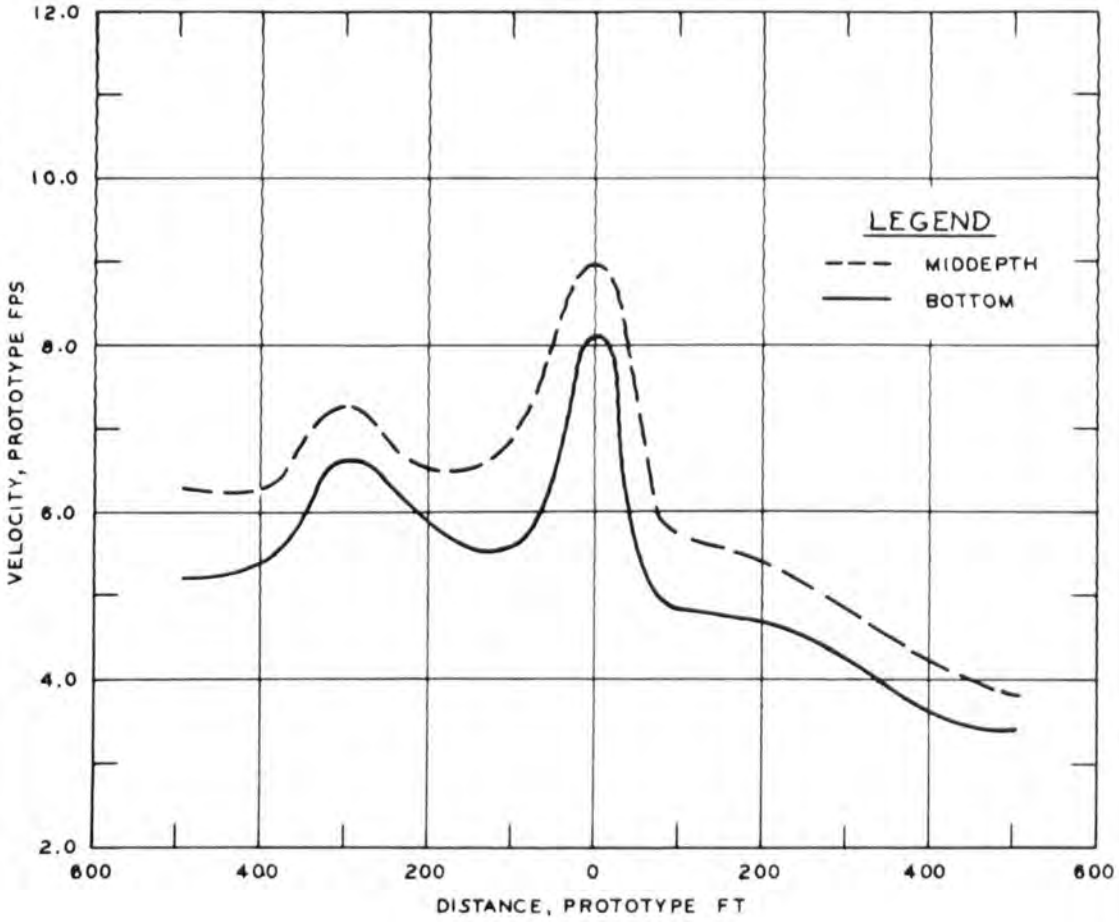


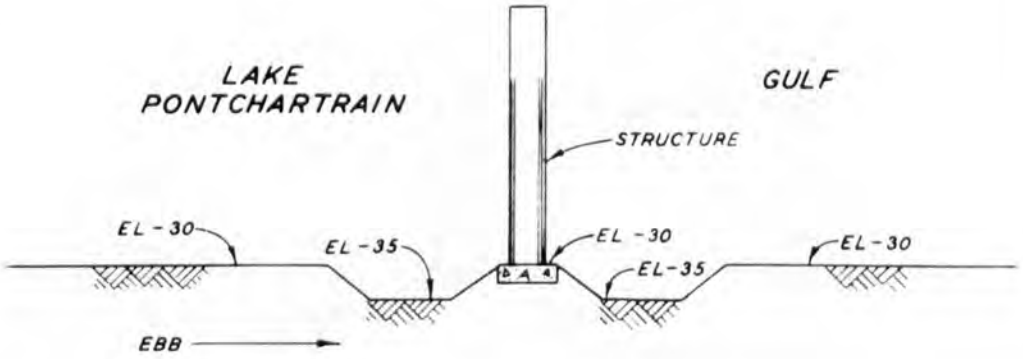
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A-1

FLOOD FLOW C= 143,000 CFS

PLATE 23



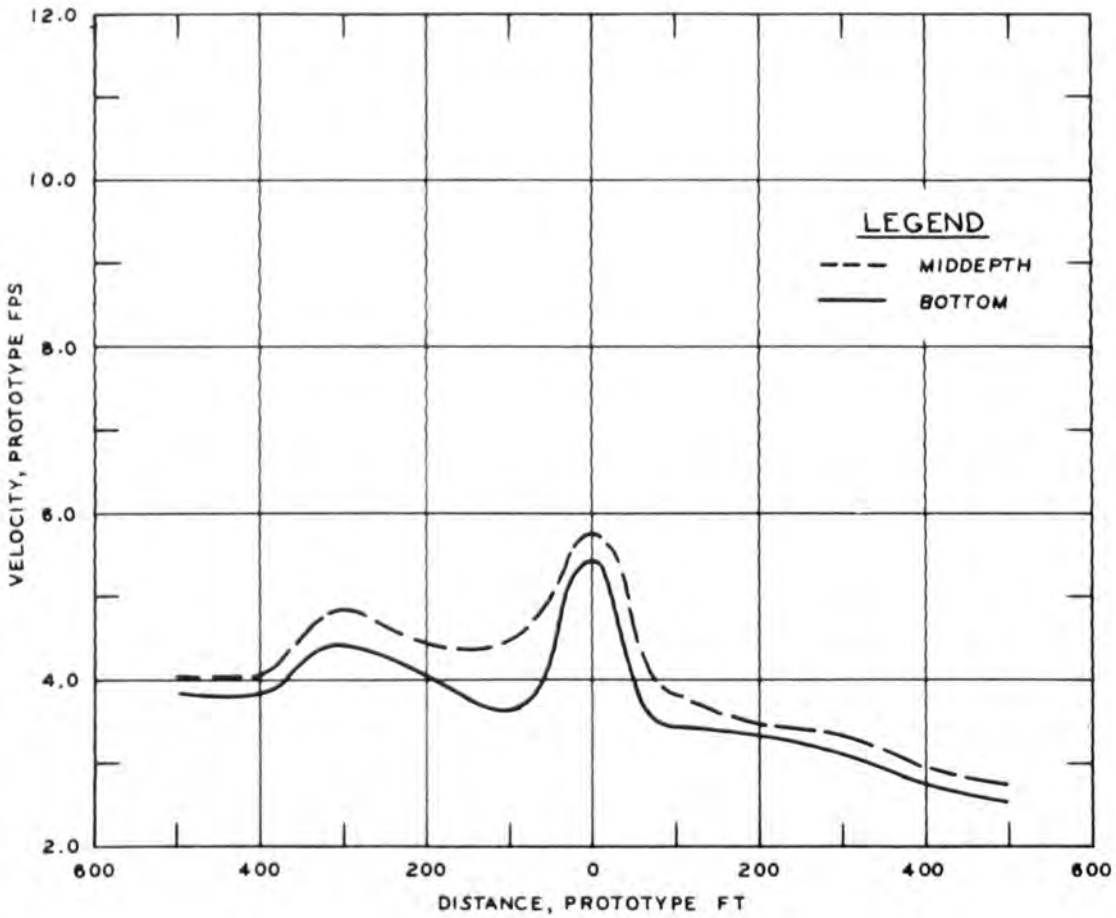


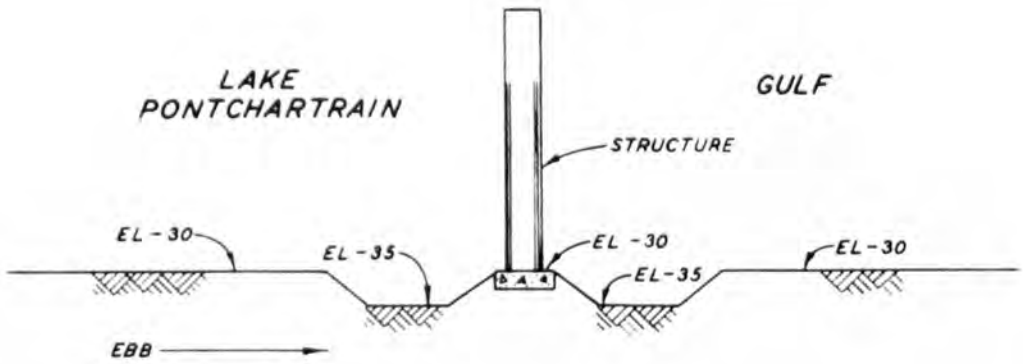
NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A-1

EBB FLOW A= 223,000 CFS

PLATE 24





NOTE: ELEVATIONS ARE IN FEET REFERRED TO MEAN SEA LEVEL.

PLAN 2A-1

EBB FLOW C= 143,000 CFS

PLATE 25

APPENDIX A: SUPPLEMENTARY DATA

Table A1

Velocities with Plan 1

Station	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
2D	2.1	2.4	1.6	1.8	1.6	1.6	1.0	1.0	0.5	0.8
2A	2.0	2.5	1.6	2.1	1.5	1.9	1.2	1.2	0.6	0.8
2E	1.7	2.5	1.6	1.9	1.4	1.9	1.0	1.0	0.7	1.0
2F	2.7	2.4	2.2	2.0	2.1	1.7	1.5	1.1	0.9	0.9
2B	3.2	2.3	2.7	1.5	2.5	1.7	1.7	0.9	1.1	0.7
2G	3.2	2.6	2.6	2.2	2.2	1.6	1.8	1.2	1.0	0.9
2H	3.1	2.6	2.1	1.9	2.1	1.6	1.4	1.1	1.0	0.9
2C	1.9	3.1	1.8	2.2	1.5	1.6	1.5	1.2	1.0	1.1
2I	2.4	2.8	1.8	1.9	1.8	1.8	1.2	1.2	0.7	1.0
2J	1.5	2.3	1.1	1.8	0.9	1.4	0.8	1.2	0.4	0.9
2K	1.4	1.8	1.0	1.5	0.9	1.1	0.8	1.0	0.4	0.8
Average	2.3	2.5	1.8	1.9	1.7	1.6	1.3	1.1	0.8	0.9
3A	1.9	2.6	1.6	2.1	1.5	1.6	1.2	1.1	0.8	0.8
3B	1.7	2.2	1.5	2.1	1.2	1.4	1.0	1.2	0.6	0.6
3C	1.8	1.6	1.5	1.4	1.5	1.4	1.1	1.0	0.8	0.4
Average	1.8	2.1	1.5	1.9	1.4	1.5	1.1	1.1	0.7	0.6
4-1/2 A	0.1	0.9	0.1	0.4	0.1	0.6	0.1	0.1	0.3	0.3
4-1/2 B	0.1	1.5	0.3	1.5	0.1	1.3	0.1	1.0	0.3	1.2
4-1/2 C	1.6	1.0	1.6	0.8	1.0	0.6	1.0	0.5	0.8	0.6
4-1/2 D	1.2	0.1	1.1	0.6	0.8	0.3	0.7	0.1	0.5	0.3
Average	0.8	0.9	0.8	0.8	0.5	0.7	0.5	0.4	0.5	0.6
11A	1.9	2.8	1.4	2.4	1.3	1.8	1.0	1.0	0.8	0.5
11B	2.1	2.7	1.5	2.1	1.4	1.8	1.0	1.3	0.8	0.9
11C	1.9	2.6	1.5	2.3	1.3	1.8	1.1	1.3	0.8	1.0
11D	0.7	-0.6	0.4	-0.5	0.4	-0.3	0.4	0.7	0.3	0.0
Average	1.7	1.9	1.2	1.6	1.1	1.3	0.9	1.0	0.7	0.6
12A	2.9	-0.5	2.2	-0.6	1.9	-0.4	1.5	0.1	1.0	-0.1
12B	3.0	6.2	2.4	4.4	1.9	3.5	1.5	2.1	1.0	1.6
12C	2.9	5.3	2.2	4.6	1.8	3.3	1.3	1.8	0.9	1.6
12D	2.9	5.0	2.4	4.7	2.1	3.2	1.5	2.2	0.9	1.6
12E	2.7	-0.4	2.2	-0.9	1.8	-0.2	1.3	0.1	0.8	-0.2
Average	2.9	3.1	2.3	2.4	1.9	1.9	1.4	1.3	0.9	0.9
13A	5.3	4.3	4.1	3.7	3.7	3.0	2.6	1.8	1.8	1.4
13B	4.9	4.3	3.5	3.8	3.2	3.0	2.3	2.1	1.7	1.4
13C	5.5	4.7	4.3	3.9	3.7	3.2	2.7	2.0	2.0	1.5
13D	4.4	4.3	3.5	3.9	3.3	3.2	2.4	2.1	1.6	1.5
13E	4.4	4.3	2.9	3.4	2.9	2.6	2.0	1.7	1.4	1.0
Average	4.9	4.4	3.7	3.7	3.4	3.0	2.4	1.9	1.7	1.4

Table A2

Velocities with Plan 2

Station	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
2D	2.8	3.6	2.0	2.6	1.7	2.1	1.4	1.4	1.0	1.1
2A	2.0	4.0	1.7	3.1	1.5	2.5	1.2	1.6	0.9	1.1
2E	1.9	4.0	1.7	2.9	1.5	2.3	1.2	1.7	0.9	1.1
2F	2.9	3.5	2.3	2.8	1.8	2.3	1.7	1.6	1.1	1.2
2B	3.1	3.5	2.4	2.7	2.0	2.1	1.6	1.5	1.1	1.1
2G	2.5	3.6	2.1	2.6	1.8	2.2	1.4	1.5	1.0	1.1
2H	2.5	2.8	2.1	2.6	1.7	2.0	1.4	1.4	1.0	1.2
2C	2.6	1.8	2.1	1.6	1.9	1.4	1.4	1.1	1.0	1.0
2I	2.6	2.5	2.1	2.0	1.9	1.6	1.5	1.5	1.1	1.1
2J	1.6	0.7	1.2	0.7	0.9	0.5	0.8	0.6	0.6	0.4
2K	1.7	1.2	1.3	0.7	1.0	0.5	1.0	-0.3	0.6	-0.3
Average	2.4	2.8	1.9	2.2	1.6	1.8	1.3	1.2	0.9	0.9
3A	2.6	2.5	1.9	1.7	1.6	1.5	1.2	1.0	0.7	0.6
3B	2.5	6.0	1.9	5.1	1.8	4.3	1.4	2.9	0.8	2.2
3C	2.5	0.1	2.0	0.4	1.8	0.3	1.1	0.0	-0.7	0.0
Average	2.5	2.9	1.9	2.4	1.7	2.0	1.2	1.3	0.3	1.0
4A	1.9	1.4	1.3	1.2	1.1	1.0	0.8	0.8	0.0	0.9
4B	2.2	1.0	1.5	1.1	1.5	0.7	1.0	0.7	0.0	0.7
4C	2.2	0.5	1.5	0.7	1.1	1.0	1.1	0.0	0.0	0.0
Average	2.1	1.0	1.4	1.0	1.2	0.9	1.0	0.5	0.0	0.6
4-1/2 A	1.2	0.4	1.0	0.5	0.9	0.6	0.6	0.6	0.0	0.7
4-1/2 B	2.2	1.4	1.6	1.4	1.3	1.2	1.0	1.3	0.0	1.2
4-1/2 C	0.9	1.2	0.0	1.0	0.0	0.6	0.0	0.5	0.0	0.5
4-1/2 D	0.0	0.5	-0.3	0.5	0.0	0.6	0.0	0.3	0.0	0.3
Average	1.1	0.9	0.6	0.9	0.6	0.8	0.4	0.7	0.0	0.9
5A	--	--	--	--	--	--	--	--	--	--
5B	0.0	2.0	0.0	1.6	0.0	1.3	0.0	0.7	0.0	0.4
5C	0.0	0.5	0.0	0.6	0.0	0.4	0.0	0.3	0.0	0.0
Average	0.0	1.2	0.0	1.1	0.0	0.8	0.0	0.5	0.0	0.2

(Continued)

Table A2 (Concluded)

	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
Station	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
5-1/2 D	5.6	2.0	4.1	1.7	3.7	1.3	2.9	1.1	1.9	0.7
5-1/2 A	5.5	2.3	4.4	1.9	3.6	1.5	2.7	1.1	1.8	0.9
5-1/2 B	-0.4	2.4	-0.2	1.9	0.0	1.6	-0.2	1.1	0.0	0.9
5-1/2 C	-0.9	1.7	-0.5	1.6	-0.5	1.2	-0.4	0.9	0.0	0.7
Average	2.5	2.1	2.0	1.8	1.7	1.4	1.3	1.1	0.9	0.8
6D	5.2	2.1	3.9	1.4	3.3	1.2	2.4	0.7	1.6	0.5
6A	5.1	2.6	4.1	1.9	3.6	1.6	2.8	1.1	1.7	0.8
6E	4.2	2.7	3.2	1.9	2.6	1.6	1.9	1.1	1.2	0.8
6F	1.8	2.9	1.1	1.9	1.2	1.6	1.0	1.2	0.5	0.8
6B	0.4	3.1	0.3	2.2	0.0	1.9	0.2	1.1	0.2	0.9
6G	-0.2	2.8	0.0	2.1	0.0	1.8	0.0	1.1	0.0	0.9
6H	-0.5	2.8	-0.2	2.1	-0.2	1.8	0.0	1.1	0.0	0.9
6C	-0.8	2.4	-0.4	1.8	-0.3	1.6	-0.3	0.9	-0.2	0.7
6I	-0.9	1.6	-0.7	1.1	-0.6	0.7	-0.5	0.8	-0.2	0.5
Average	1.6	2.6	1.2	1.8	1.1	1.5	0.8	1.0	0.5	0.7
7A	1.7	1.9	2.0	1.7	1.2	1.5	1.4	1.1	0.8	0.8
7B	3.0	2.2	2.1	1.9	1.8	1.7	1.4	1.1	0.9	0.9
7C	0.8	2.2	0.5	1.9	0.6	1.4	0.5	1.0	0.4	0.8
Average	1.8	2.1	1.5	1.8	1.2	1.5	1.1	1.1	0.7	0.8
8A	0.2	1.6	0.0	1.4	0.0	1.0	0.0	0.8	0.0	0.7
8B	2.7	2.0	1.9	1.4	1.7	1.2	1.2	0.6	0.9	0.2
8C	2.7	1.2	2.4	0.8	1.9	0.6	1.3	0.2	0.8	0.0
Average	1.9	1.6	1.5	1.2	1.2	0.9	0.9	0.5	0.6	0.3

Table A3

Velocities with Plan 2A

Station	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
2D	2.6	3.1	1.8	2.8	1.6	1.8	1.4	1.2	0.9	1.0
2A	1.9	3.1	1.5	2.8	1.5	1.9	1.2	1.4	0.8	1.0
2E	1.9	3.1	1.6	2.8	1.4	1.8	1.2	1.2	0.9	1.0
2F	2.5	2.9	2.2	2.9	2.0	1.9	1.6	1.3	1.1	1.0
2B	3.1	2.5	2.4	2.4	2.1	1.5	1.7	1.0	1.3	0.8
2G	2.9	2.8	2.1	2.4	1.8	1.8	1.5	1.0	1.2	0.8
2H	2.4	3.1	2.0	2.6	1.8	1.7	1.5	1.0	1.2	1.0
2C	2.6	2.5	2.3	2.1	1.9	1.8	1.4	1.4	1.1	1.1
2I	2.3	2.4	2.1	2.0	1.8	1.7	1.4	1.2	1.1	0.8
2J	1.3	0.9	1.5	0.8	1.1	0.7	1.0	0.3	0.7	0.2
2K	1.5	-0.8	1.2	-0.3	1.2	-0.3	1.2	0.2	1.0	0.0
Average	2.3	2.3	1.9	2.1	1.6	1.5	1.4	1.0	1.0	0.8
3A	2.4	2.2	2.0	2.2	1.7	1.4	1.4	0.9	1.0	0.5
3B	2.5	5.5	1.7	4.6	1.7	3.8	1.3	2.6	1.0	1.6
3C	2.5	0.9	2.0	0.5	1.8	0.6	1.6	0.5	1.2	0.2
Average	2.5	2.9	1.9	2.4	1.7	1.9	1.4	1.3	1.1	0.8
4A	1.8	1.2	1.5	1.1	1.4	1.0	1.2	1.0	0.8	1.1
4B	1.7	0.6	1.9	1.1	1.4	0.8	1.4	0.6	1.0	0.6
4C	1.7	1.1	1.6	0.8	1.4	0.5	1.0	0.5	1.2	0.2
Average	1.7	1.0	1.7	1.0	1.4	0.8	1.2	0.7	1.0	0.6
4-1/2 A	1.1	1.1	1.1	0.9	1.1	0.7	0.7	0.5	0.3	0.5
4-1/2 B	1.7	1.3	1.4	1.3	1.2	1.3	0.9	1.1	0.5	0.9
4-1/2 C	0.8	1.0	0.0	0.8	0.0	0.8	0.0	0.6	0.0	0.8
4-1/2 D	0.0	0.5	-0.3	0.3	0.0	0.3	0.0	0.0	0.0	0.0
Average	0.9	1.0	0.6	0.8	0.6	0.8	0.4	0.6	0.2	0.6
5A	--	--	--	--	--	--	--	--	--	--
5B	-0.3	2.5	-0.4	2.1	-0.3	1.8	0.3	1.2	-0.3	0.8
5C	-0.4	0.8	-0.3	0.8	-0.3	1.0	0.3	0.6	-0.3	0.2
Average	-0.3	1.6	-0.3	1.4	-0.3	1.4	0.3	0.9	-0.3	0.5

(Continued)

Table A3 (Concluded)

Station	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
5-1/2 D	4.5	1.9	3.5	1.7	2.8	1.3	2.3	0.6	1.6	0.5
5-1/2 A	3.7	2.4	3.0	1.9	2.7	1.4	2.0	1.0	1.4	0.8
5-1/2 B	0.5	2.3	0.4	1.9	0.2	1.4	0.3	1.0	0.4	0.8
5-1/2 C	-0.4	1.9	-0.4	1.4	-0.3	1.1	0.0	0.6	-0.2	0.6
Average	2.1	2.1	1.6	1.7	1.4	1.3	1.1	0.8	0.8	0.7
6D	4.2	1.6	3.5	1.4	3.0	1.1	2.2	0.8	1.5	0.0
6A	4.5	2.2	3.8	1.8	3.1	1.6	2.5	1.1	1.7	0.6
6E	4.0	2.3	3.2	2.1	2.7	1.6	2.2	1.1	1.3	0.7
6F	2.1	2.6	1.6	2.2	1.5	1.7	1.3	1.2	0.7	0.8
6B	1.0	2.0	0.9	2.0	0.6	1.3	0.6	1.0	0.3	0.7
6G	0.3	2.5	0.2	2.0	0.0	1.6	0.0	1.1	0.0	0.7
6H	0.0	2.5	0.0	2.0	0.0	1.6	0.2	1.0	0.0	0.8
6C	-0.2	2.2	-0.3	1.9	0.0	1.5	0.0	1.0	0.2	0.9
6I	-0.5	1.3	-0.4	1.3	-0.2	1.2	0.2	0.7	0.0	0.7
Average	1.7	2.1	1.4	1.9	1.2	1.5	1.0	1.0	0.7	0.7
7A	3.2	2.1	2.4	1.7	2.2	1.4	1.6	0.8	1.1	0.6
7B	2.5	2.2	1.2	1.9	1.3	1.5	1.0	0.9	0.7	0.7
7C	0.4	2.4	0.4	1.7	0.3	1.2	0.2	0.8	-0.2	0.6
Average	2.0	2.2	1.3	1.8	1.3	1.4	0.9	0.8	0.5	0.6
8A	1.2	1.7	0.7	1.6	0.6	1.3	-0.3	1.2	-0.4	0.8
8B	2.6	2.0	2.2	1.8	2.0	1.3	1.5	0.8	1.1	0.5
8C	2.7	1.5	2.1	1.0	1.8	0.8	1.6	0.6	1.2	0.4
Average	2.2	1.7	1.7	1.5	1.5	1.1	0.9	0.9	0.6	0.6

Table A4

Velocities with Plan 2B

Station	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
2D	2.6	3.2	1.9	2.6	1.7	2.0	1.2	1.4	0.8	1.2
2A	1.9	3.3	1.7	2.5	1.3	2.1	1.0	1.4	0.6	1.2
2E	1.7	3.2	1.7	2.3	1.3	2.0	1.0	1.3	0.7	1.1
2F	2.7	3.0	2.1	2.4	1.9	2.0	1.5	1.2	1.0	1.2
2B	3.2	2.3	2.6	1.9	2.3	1.2	1.5	1.0	1.2	0.9
2G	2.8	2.5	2.2	1.9	1.8	1.6	1.5	1.0	1.0	1.1
2H	2.6	3.0	2.2	2.5	2.0	2.0	1.2	1.3	1.0	1.2
2C	2.6	2.8	2.1	2.2	2.1	1.9	1.4	1.2	1.0	1.0
2I	2.5	2.0	2.0	1.7	1.8	1.5	1.2	0.9	1.0	0.8
2J	1.6	1.1	1.4	1.1	1.2	1.0	1.5	0.7	0.6	0.6
2K	1.6	0.3	1.3	0.4	1.1	0.4	1.0	0.3	0.6	0.4
Average	2.3	2.4	1.9	2.0	1.7	1.6	1.3	1.1	0.9	1.0
3A	2.3	1.6	1.7	1.8	1.6	1.3	1.2	1.0	0.9	0.2
3B	2.2	4.4	1.6	3.7	1.5	2.8	1.1	1.9	0.7	1.5
3C	2.7	1.2	1.9	1.1	1.8	1.1	1.4	0.8	0.9	0.7
Average	2.4	2.4	1.7	2.2	1.6	1.7	1.2	1.2	0.8	0.8
4A	0.6	1.2	0.7	0.9	0.6	1.0	0.6	0.8	0.3	0.6
4B	0.4	1.4	1.6	1.2	1.4	0.9	1.3	0.6	0.9	0.2
4C	2.3	0.6	1.4	0.6	1.4	0.7	1.3	0.2	0.7	0.2
Average	1.1	1.1	1.2	0.9	1.1	0.9	1.1	0.5	0.6	0.3
4-1/2 A	-0.9	0.6	-0.8	0.6	0.8	0.6	-0.6	0.7	0.4	0.4
4-1/2 B	-1.9	1.1	-1.3	1.2	-1.2	1.1	-1.0	0.9	0.6	0.8
4-1/2 C	-1.1	0.6	0.3	0.6	0.2	0.7	0.2	0.6	0.2	0.2
4-1/2 D	0.2	0.6	0.2	0.0	0.2	0.4	0.2	0.6	0.2	0.2
Average	-0.9	0.7	-0.4	0.6	0.0	0.7	-0.3	0.7	0.4	0.4
5A	--	--	--	--	--	--	--	--	--	--
5B	0.2	3.2	0.0	2.6	0.0	2.3	0.0	1.5	0.0	1.2
5C	0.0	0.9	0.0	0.6	0.0	0.5	0.0	0.6	0.0	0.0
Average	0.1	2.0	0.0	1.6	0.0	1.4	0.0	1.0	0.0	0.6

(Continued)

Table A4 (Concluded)

	Velocity, fps									
	Flow A		Flow B		Flow C		Flow D		Flow E	
Station	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
5-1/2 D	3.5	2.1	2.8	1.7	2.4	1.4	1.9	1.0	1.4	0.7
5-1/2 A	3.3	2.1	2.5	1.7	2.2	1.5	1.7	1.1	1.2	0.7
5-1/2 B	1.9	1.7	1.7	1.5	1.6	1.2	1.3	0.9	1.0	0.7
5-1/2 C	-0.2	1.8	0.2	1.6	0.2	1.3	0.0	1.0	0.2	0.7
Average	2.1	1.9	1.8	1.6	1.6	1.3	1.2	1.0	1.0	0.7
6D	3.6	1.7	2.8	1.3	2.3	1.1	1.9	0.7	1.2	0.5
6A	3.8	2.2	3.0	1.8	2.5	1.5	2.0	1.0	1.2	0.6
6E	3.2	2.4	2.5	1.8	2.4	1.6	1.7	1.0	1.0	0.7
6F	2.1	2.7	1.6	2.1	1.6	1.7	1.1	1.1	0.4	0.8
6B	2.0	2.0	1.7	1.6	1.3	1.3	1.1	0.8	0.6	0.5
6G	1.5	2.5	1.3	1.9	1.2	1.6	0.8	1.0	0.5	0.7
6H	0.5	2.5	0.4	1.8	0.5	1.5	0.3	0.8	0.0	0.7
6C	0.3	2.3	0.5	1.8	0.0	1.6	0.0	1.1	0.0	0.9
6I	0.3	1.2	0.2	1.1	0.0	1.0	0.0	0.9	0.0	0.6
Average	1.9	2.2	1.6	1.7	1.3	1.4	1.0	0.9	0.5	0.7
7A	2.7	1.9	2.1	1.8	1.8	1.5	1.3	1.0	1.0	0.9
7B	1.7	2.3	1.2	1.9	1.2	1.5	0.8	1.1	0.6	0.8
7C	1.2	2.3	0.9	1.8	1.1	1.6	0.7	1.1	0.4	0.7
Average	1.9	2.2	1.4	1.8	1.4	1.5	0.9	1.1	0.7	0.8
8A	0.6	1.8	0.0	1.4	0.0	1.3	0.0	1.1	0.0	0.7
8B	2.7	2.2	2.0	1.8	1.7	1.4	1.4	0.9	0.9	0.6
8C	2.7	1.0	1.9	1.1	1.8	0.4	1.3	0.5	0.9	0.2
Average	2.0	1.7	1.3	1.4	1.2	1.0	0.9	0.8	0.6	0.5

Table A5

Water-Surface Elevations for Plan 1, Flow A

Station	Water-Surface Elevations, ft msl							
	Flood			Ebb				
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 4	Run 5
T1	2.50	2.00	1.70	0.45	-0.30	-0.90	-2.10	-4.40
T2	2.40	2.00	1.65	0.70	0.00	-0.60	-1.80	-3.90
T14	2.45	2.00	1.70	0.70	0.00	-0.55	-1.70	-3.90
T15	2.45	1.95	1.60	0.70	0.00	-0.60	-1.70	-3.90
T3	2.55	2.10	1.80	0.85	0.20	-0.40	-1.60	-3.60
G14	2.35	1.80	1.50	0.85	0.20	-0.40	-1.60	-3.60
G13	2.25	1.70	1.40	0.80	0.15	-0.40	-1.60	-3.65
G12	2.05	1.60	1.30	0.80	0.00	-0.50	-1.70	-3.75
G11	1.85	1.30	1.00	0.95	0.40	-0.30	-1.40	-3.30
L11	0.50	-0.05	-0.50	1.00	0.45	-0.15	-1.20	-3.00
L12	0.65	0.00	-0.30	1.95	1.40	0.85	-0.15	-1.70
L13	0.80	0.20	-0.10	2.40	1.85	1.40	0.55	-0.80
T13	2.40	1.90	1.55	0.85	0.30	-0.40	-1.50	Dry
T12	0.70	0.15	-0.20	2.60	2.05	1.60	0.75	-0.50
T11	0.10	-0.90	-2.10	2.70	2.25	1.80	1.20	0.30
T10	0.40	-0.50	-1.60	2.60	2.15	1.75	1.00	0.20
T16	0.30	-0.60	-1.70	2.60	2.15	1.80	1.10	0.25
T9	0.40	-0.50	-1.50	2.65	2.20	1.80	1.10	0.20
T8	0.35	-0.50	-1.60	2.65	2.15	1.75	1.00	0.20
T7	0.40	-0.50	-1.50	2.65	2.20	1.80	1.10	0.20
T6	0.40	-0.50	-1.60	2.60	2.10	1.70	1.00	0.15
T5	0.45	-0.50	-1.50	2.55	2.05	1.70	1.00	0.20
T4	0.35	-0.50	-1.55	2.70	2.20	1.85	1.10	0.20

Table A6

Water-Surface Elevations for Plan 1, Flow B

Station	Water-Surface Elevations, ft msl						
	Flood			Ebb			
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 4
T1	1.70	1.00	0.30	0.80	-0.35	-1.20	-2.40
T2	1.80	1.15	0.25	0.90	-0.15	-1.00	-2.25
T14	1.75	1.15	0.25	0.90	-0.10	-1.00	-2.20
T15	1.80	1.15	0.25	0.95	-0.15	-1.00	-2.20
T3	1.80	1.15	0.25	0.85	-0.10	-0.95	-2.10
G14	1.75	1.00	0.20	0.95	-0.05	-0.90	-2.15
G13	1.70	1.00	0.10	0.90	-0.15	-0.95	-2.15
G12	1.60	0.80	0.05	0.95	-0.15	-1.00	-2.20
G11	1.50	0.70	-0.30	0.95	-0.10	-0.90	-2.10
L11	0.70	-0.30	-1.25	1.10	0.00	-0.80	-1.95
L12	0.75	-0.30	-1.15	1.55	0.55	-0.25	-1.25
L13	0.85	0.05	-1.05	1.95	1.05	0.35	-0.60
T13	1.70	1.05	0.20	1.00	0.00	-0.90	-2.10
T12	0.90	0.05	-0.90	2.00	1.10	0.35	-0.55
T11	0.35	-0.60	-3.50	2.10	1.25	0.70	0.00
T10	0.65	-0.30	-3.10	2.10	1.25	0.60	-0.10
T16	0.60	-0.30	-3.10	2.05	1.30	0.70	0.00
T9	0.65	-0.30	-3.00	2.10	1.25	0.65	-0.05
T8	0.65	-0.30	-3.10	2.10	1.30	0.70	-0.05
T7	0.50	-0.35	Dry	2.10	1.30	0.65	0.00
T6	0.60	-0.30	-3.05	2.00	1.20	0.60	-0.10
T5	0.65	-0.30	-3.05	2.10	1.30	0.70	0.00
T4	0.60	-0.30	-3.00	2.10	1.30	0.70	0.00

Table A7

Water-Surface Elevations for Plan 1, Flow C

Station	Water-Surface Elevations, ft msl								
	Flood				Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 1	Run 2	Run 3	Run 4	Run 5
T1	2.00	1.10	0.55	0.00	1.10	0.40	-0.15	-0.55	-1.40
T2	1.90	0.95	0.60	-0.10	1.10	0.40	-0.15	-0.50	-1.30
T14	2.00	1.00	0.60	-0.05	1.10	0.40	-0.10	-0.50	-1.25
T15	1.90	1.00	0.60	-0.10	1.10	0.45	-0.10	-0.40	-1.20
T3	2.00	1.10	0.55	0.00	1.20	0.60	0.10	-0.40	-1.15
G14	1.80	0.85	0.50	-0.25	1.20	0.50	0.00	-0.35	-1.15
G13	1.70	0.75	0.50	-0.35	1.10	0.45	-0.05	-0.45	-1.20
G12	1.70	0.75	0.45	-0.40	1.10	0.40	-0.10	-0.50	-1.25
G11	1.60	0.60	0.40	-0.50	1.20	0.50	0.00	-0.35	-1.10
L11	1.05	0.00	-0.35	-1.30	1.20	0.50	0.10	-0.30	-1.10
L12	1.10	0.05	-0.25	-1.20	1.60	0.90	0.45	0.05	-0.70
L13	1.20	0.20	-0.20	-1.10	1.80	1.20	0.70	0.35	-0.40
T13	1.85	0.90	0.45	-1.20	1.20	0.50	0.00	-0.40	-1.10
T12	1.25	0.20	-0.35	-1.10	1.90	1.30	0.80	0.50	-0.20
T11	1.05	-0.10	-0.65	-2.70	2.00	1.45	1.00	0.70	0.10
T10	1.10	0.00	-0.70	-2.45	2.00	1.45	1.00	0.70	0.10
T16	1.15	-0.05	-0.70	-2.50	2.00	1.40	1.00	0.70	0.10
T9	1.10	0.00	-0.60	-2.40	2.00	1.40	1.00	0.70	0.10
T8	1.10	0.00	-0.60	-2.40	2.00	1.40	1.00	0.65	0.05
T7	1.10	0.00	-0.60	-2.40	2.00	1.40	1.00	0.65	0.10
T6	1.15	0.00	-0.50	-2.40	1.95	1.40	0.90	0.60	0.00
T5	1.10	-0.05	-0.65	-2.35	2.00	1.45	1.00	0.70	0.10
T4	1.15	0.00	-0.55	-2.40	2.00	1.40	1.00	0.70	0.10

Table A8

Water-Surface Elevations for Plan 1, Flow D

Station	Water-Surface Elevations, ft msl								
	Flood				Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 1	Run 2	Run 3	Run 4	Run 5
T1	2.00	1.10	0.70	0.05	1.55	1.00	0.70	0.10	-0.75
T2	1.90	0.95	0.55	-0.10	1.55	1.00	0.65	0.05	-0.80
T14	1.95	1.00	0.60	-0.05	1.60	1.00	0.60	0.10	-0.80
T15	1.90	0.95	0.55	-0.10	1.60	1.05	0.70	0.10	-0.75
T3	2.00	1.05	0.70	0.00	1.60	1.05	0.65	0.10	-0.70
G14	1.80	0.85	0.50	-0.25	1.60	1.05	0.70	0.10	-0.70
G13	1.70	0.80	0.40	-0.30	1.55	1.00	0.60	0.10	-0.75
G12	1.70	0.80	0.40	-0.30	1.45	0.95	0.60	0.00	-0.85
G11	1.65	0.70	0.30	-0.40	1.60	1.05	0.65	0.10	-0.75
L11	1.30	0.35	-0.05	-0.80	1.55	1.05	0.70	0.10	-0.70
L12	1.35	0.40	0.00	-0.75	1.75	1.20	0.80	0.30	-0.50
L13	1.40	0.45	0.05	-0.70	1.80	1.30	0.85	0.35	-0.40
T13	1.85	0.90	0.55	-0.20	1.55	1.05	0.70	0.15	-0.70
T12	1.45	0.45	0.05	-0.70	1.90	1.40	1.00	0.50	-0.30
T11	1.30	0.20	-0.15	-1.00	1.95	1.45	1.05	0.55	-0.15
T10	1.40	0.35	-0.05	-0.90	1.95	1.50	1.05	0.60	-0.10
T16	1.50	0.35	-0.05	-0.85	2.00	1.45	1.10	0.60	-0.10
T9	1.40	0.35	0.00	-0.90	2.00	1.50	1.10	0.65	-0.05
T8	1.40	0.35	0.05	-0.90	1.95	1.50	1.10	0.65	-0.10
T7	1.40	0.35	-0.05	-0.95	2.00	1.45	1.10	0.65	-0.10
T6	1.40	0.40	0.00	-0.85	1.95	1.40	1.05	0.60	-0.10
T5	1.50	0.50	0.00	-0.80	1.95	1.45	1.05	0.60	-0.10
T4	1.40	0.40	0.00	-0.80	2.05	1.50	1.15	0.65	0.00

Table A9

Water-Surface Elevations for Plan 1, Flow E

	Water-Surface Elevations, ft msl								
	Flood				Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 1	Run 2	Run 3	Run 4	Run 5
T1	1.90	0.95	0.40	-0.10	1.70	1.10	0.65	0.25	-0.30
T2	1.90	0.95	0.40	-0.05	1.70	1.15	0.70	0.25	-0.30
T14	2.00	1.00	0.45	0.00	1.75	1.15	0.65	0.20	-0.25
T15	1.90	0.95	0.40	-0.10	1.75	1.15	0.70	0.25	-0.35
T3	1.90	0.90	0.35	-0.10	1.80	1.20	0.75	0.30	-0.25
G14	1.85	0.90	0.35	-0.10	1.75	1.25	0.75	0.30	-0.20
G13	1.90	0.95	0.40	-0.05	1.75	1.25	0.75	0.25	-0.20
G12	1.95	1.00	0.40	-0.05	1.75	1.25	0.75	0.30	-0.20
G11	1.85	0.95	0.35	-0.10	1.80	1.25	0.80	0.35	-0.20
L11	1.70	0.75	0.20	-0.30	1.85	1.30	0.80	0.40	-0.15
L12	1.75	0.80	0.20	-0.15	1.95	1.35	0.85	0.45	-0.10
L13	1.70	0.80	0.20	-0.30	1.95	1.40	0.95	0.55	0.00
T13	1.80	0.85	0.30	-0.15	1.70	1.20	0.70	0.25	-0.25
T12	1.65	0.60	0.10	-0.40	1.95	1.40	0.90	0.45	0.00
T11	1.60	0.65	0.05	-0.50	1.95	1.40	0.95	0.50	0.00
T10	1.55	0.60	0.00	-0.50	2.00	1.45	1.00	0.55	0.10
T16	1.50	0.50	-0.05	-0.55	2.00	1.45	1.00	0.55	0.05
T9	1.60	0.60	0.00	-0.50	2.00	1.45	1.00	0.55	0.10
T8	1.60	0.60	0.00	-0.50	1.95	1.45	1.00	0.60	0.05
T7	1.60	0.60	0.05	-0.50	2.00	1.45	1.00	0.55	0.10
T6	1.70	0.70	0.20	-0.40	1.90	1.40	0.95	0.50	0.05
T5	1.60	0.60	0.00	-0.50	1.95	1.40	0.95	0.50	0.05
T4	1.60	0.70	0.10	-0.45	2.05	1.55	1.05	0.50	0.15

Table A10

Water-Surface Elevations for Plan 2, Flow A

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	1.45	1.90	2.40	0.75	0.15	-2.90	-1.85	-1.25	-0.40	0.30
T2	1.55	1.95	2.45	0.75	0.05	-2.55	-1.50	-0.90	-0.05	0.50
T14	1.55	1.95	2.45	0.75	0.05	-2.45	-1.50	-0.90	-0.05	0.50
T15	1.55	1.95	2.45	0.75	0.00	-2.60	-1.55	-0.95	-0.10	0.45
T3	1.40	1.75	2.30	0.60	-0.20	-2.60	-1.60	-1.05	-0.30	0.25
G22	1.35	1.75	2.25	0.55	-0.20	-2.10	-1.25	-0.75	0.05	0.65
G21	0.95	1.35	1.90	0.20	-0.65	-2.10	-1.20	-0.70	0.10	0.70
L21	-0.30	0.15	0.65	-1.25	-2.15	-0.85	0.10	0.60	1.30	1.85
L22	-0.25	0.10	0.75	-1.10	-2.00	-0.40	0.45	1.00	1.60	2.10
T4	-0.50	0.05	0.55	-1.30	-2.20	-0.25	0.65	1.15	1.85	2.35
T5	-0.35	0.05	0.65	-1.25	-2.15	-0.30	0.55	1.05	1.80	2.30
T6	-0.40	0.05	0.60	-1.30	-2.15	-0.25	0.55	1.05	1.75	2.25
T7	-0.60	-0.05	0.50	-1.45	-2.35	-0.25	0.55	1.10	1.70	2.20
T8	-0.35	0.10	0.65	-1.25	-2.15	-0.20	0.65	1.15	1.80	2.30
T9	-0.40	0.05	0.60	-1.25	-2.15	-0.15	0.65	1.20	1.90	2.30
T10	-0.45	0.05	0.55	-1.35	-2.25	-0.05	0.70	1.25	2.00	2.50
T16	-0.40	0.05	0.65	-1.25	-2.20	0.00	0.80	1.35	1.85	2.35
T13	1.35	1.80	2.25	0.60	-0.25	-1.85	-1.00	-0.20	0.35	1.00

Table A11

Water-Surface Elevations for Plan 2, Flow B

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.00	0.60	0.95	1.55	2.00	-1.75	-1.10	-0.50	0.00	0.50
T2	-0.05	0.55	0.95	1.50	2.00	-1.60	-0.90	-0.45	0.15	0.65
T14	0.00	0.55	1.00	1.55	2.05	-1.60	-0.90	-0.40	0.20	0.65
T15	-0.05	0.55	1.00	1.55	2.05	-1.60	-0.90	-0.45	0.10	0.65
T3	-0.15	0.45	0.85	1.40	1.90	-1.65	-1.00	-0.45	0.05	0.55
G22	-0.15	0.40	0.85	1.40	1.90	-1.45	-0.85	-0.35	0.25	0.75
G21	-0.45	0.15	0.60	1.15	1.70	-1.35	-0.80	-0.25	0.25	0.80
L21	-1.25	-0.65	-0.10	0.45	1.05	-0.65	0.00	0.35	1.00	1.50
L22	-1.15	-0.60	-0.10	0.55	1.00	-0.30	0.35	0.75	1.25	1.75
T4	-1.25	-0.60	-0.15	0.45	0.95	-0.15	0.45	0.90	1.35	1.85
T5	-1.20	-0.60	-0.15	0.45	1.00	-0.25	0.45	0.85	1.35	1.75
T6	-1.25	-0.60	-0.25	0.40	0.95	-0.25	0.45	0.85	1.30	1.80
T7	-1.35	-0.70	-0.25	0.35	0.95	-0.25	0.45	0.85	1.35	1.80
T8	-1.20	-0.60	-0.10	0.45	1.00	-0.20	0.45	0.90	1.40	1.85
T9	-1.25	-0.65	-0.15	0.45	1.00	-0.15	0.40	0.90	1.35	1.85
T10	-1.25	-0.70	-0.20	0.35	0.95	-0.05	0.50	1.00	1.45	1.95
T16	-1.25	-0.60	-0.15	0.45	1.00	0.00	0.55	1.00	1.45	1.95
T13	-0.20	0.45	0.85	1.40	1.90	-1.20	-0.70	-0.10	0.50	1.00

Table A12

Water-Surface Elevations for Plan 2, Flow C

Station	Water-Surface Elevations, ft msl									
	Flood					Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.00	0.50	0.95	1.45	1.90	-1.05	-0.50	-0.05	0.60	1.00
T2	0.00	0.55	0.95	1.50	2.00	-1.00	-0.40	0.05	0.70	1.10
T14	0.10	0.60	0.95	1.55	2.00	-0.95	-0.40	0.05	0.70	1.15
T15	0.00	0.55	0.90	1.50	2.00	-1.00	-0.40	0.00	0.65	1.05
T3	-0.05	0.50	0.85	1.45	1.95	-1.00	-0.50	0.00	0.60	1.10
G22	-0.10	0.45	0.70	1.40	1.95	-0.85	-0.40	0.10	0.75	1.15
G21	-0.20	0.35	0.65	1.30	1.80	-0.85	-0.30	0.15	0.75	1.15
L21	-0.90	-0.40	0.10	0.70	1.20	-0.35	0.05	0.60	1.20	1.65
L22	-0.85	-0.25	0.10	0.80	1.30	-0.15	0.35	0.85	1.45	1.85
T4	-0.85	-0.30	0.05	0.75	1.25	-0.05	0.45	0.90	1.55	1.95
T5	-0.85	-0.30	0.05	0.65	1.20	-0.10	0.35	0.90	1.45	1.85
T6	-0.85	-0.30	0.05	0.70	1.20	-0.10	0.35	0.85	1.50	1.95
T7	-0.95	-0.40	0.00	0.65	1.20	-0.05	0.40	0.80	1.50	2.00
T8	-0.90	-0.35	0.00	0.65	1.20	-0.05	0.35	0.90	1.50	1.95
T9	-0.90	-0.35	0.05	0.65	1.20	-0.10	0.40	0.90	1.45	1.90
T10	-0.95	-0.45	0.00	0.60	1.10	0.00	0.45	1.00	1.55	1.95
T16	-0.90	-0.40	0.05	0.70	1.20	0.05	0.50	1.00	1.60	2.00
T13	-0.10	0.45	0.75	1.45	1.90	-0.80	-0.20	0.30	0.95	1.20

Table A13

Water-Surface Elevations for Plan 2, Flow D

Station	Water-Surface Elevations, ft msl									
	Flood					Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.05	0.50	1.05	1.45	1.90	-0.50	0.05	0.55	1.15	1.55
T2	0.05	0.50	1.05	1.45	1.90	-0.45	0.05	0.60	1.15	1.55
T14	0.05	0.50	1.05	1.45	1.90	-0.45	0.10	0.60	1.15	1.55
T15	0.05	0.45	1.00	1.40	1.85	-0.50	0.05	0.60	1.15	1.55
T3	0.00	0.40	0.95	1.40	1.85	-0.45	0.10	0.60	1.15	1.55
G22	-0.05	0.40	0.95	1.35	1.85	-0.45	0.10	0.65	1.15	1.60
G21	-0.15	0.25	0.85	1.25	1.70	-0.40	0.15	0.65	1.20	1.60
L21	-0.50	-0.05	0.50	0.90	1.35	-0.25	0.25	0.75	1.30	1.75
L22	-0.50	-0.10	0.50	0.95	1.40	-0.05	0.55	1.00	1.50	1.95
T4	-0.55	-0.05	0.50	0.95	1.35	0.00	0.55	1.10	1.55	2.00
T5	-0.50	-0.10	0.50	0.95	1.35	-0.05	0.45	0.95	1.45	1.95
T6	-0.50	-0.15	0.50	0.95	1.35	-0.05	0.55	1.05	1.60	2.00
T7	-0.55	-0.15	0.45	0.90	1.30	0.00	0.55	1.00	1.55	2.00
T8	-0.45	-0.10	0.45	0.90	1.35	0.00	0.55	1.00	1.55	1.95
T9	-0.55	-0.10	0.50	0.90	1.30	0.00	0.55	1.00	1.55	1.95
T10	-0.60	-0.20	0.40	0.80	1.25	-0.05	0.50	1.00	1.55	1.95
T16	-0.50	-0.10	0.45	0.90	1.35	0.05	0.55	1.05	1.60	2.00
T13	-0.10	0.35	0.90	1.35	1.75	-0.30	0.15	0.65	1.25	1.65

Table A14

Water-Surface Elevations for Plan 2, Flow E

Station	Water-Surface Elevations, ft msl									
	Flood					Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.95	0.45	1.45	2.00	0.05	-0.20	0.25	0.70	1.25	1.75
T2	1.00	0.45	1.45	2.00	0.05	-0.15	0.30	0.75	1.25	1.75
T14	1.00	0.45	1.45	2.00	0.05	-0.15	0.30	0.75	1.25	1.75
T15	1.00	0.45	1.40	2.00	0.05	-0.15	0.25	0.75	1.25	1.75
T3	0.90	0.35	1.30	1.90	0.00	-0.15	0.20	0.65	1.20	1.70
G22	0.90	0.40	1.35	1.95	-0.05	-0.15	0.30	0.75	1.25	1.80
G21	0.95	0.40	1.35	1.95	-0.05	-0.10	0.30	0.75	1.25	1.85
L21	0.70	0.15	1.15	1.75	-0.20	-0.10	0.40	0.85	1.45	1.90
L22	0.75	0.20	1.25	1.80	-0.20	0.00	0.50	0.95	1.50	1.95
T4	0.65	0.15	1.20	1.75	-0.25	0.15	0.45	0.95	1.45	1.95
T5	0.60	0.15	1.15	1.75	-0.20	0.00	0.45	0.90	1.45	1.95
T6	0.70	0.15	1.20	1.80	-0.25	0.10	0.50	1.00	1.50	2.00
T7	0.60	0.15	1.15	1.70	-0.25	0.05	0.45	0.95	1.45	1.95
T8	0.75	0.20	1.15	1.75	-0.20	0.05	0.50	0.95	1.45	1.95
T9	0.60	0.10	1.10	1.65	-0.20	0.00	0.45	0.95	1.45	1.95
T10	0.60	0.00	1.05	1.65	-0.25	0.00	0.50	0.95	1.45	1.95
T16	0.70	0.10	1.15	1.75	-0.20	0.10	0.50	0.95	1.50	1.95
T13	0.85	0.35	1.35	1.85	0.00	-0.15	0.35	0.75	1.30	1.80

Table A15

Water-Surface Elevations for Plan 2A, Flow A

	Water-Surface Elevations, ft msl											
	Flood						Ebb					
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
T1	-0.15	0.45	0.80	1.35	1.95	2.35	-1.75	-1.20	-0.70	0.10	0.50	1.00
T2	-0.05	0.50	0.90	1.50	2.00	2.40	-1.40	-0.90	-0.35	0.25	0.80	1.20
T14	-0.05	0.55	0.90	1.50	2.00	2.40	-1.35	-0.90	-0.30	0.30	0.80	1.30
T15	-0.15	0.45	0.85	1.40	1.95	2.35	-1.40	-0.90	-0.35	0.30	0.80	1.20
T3	-0.30	0.35	0.70	1.25	1.85	2.25	-1.45	-0.95	-0.45	0.30	0.65	1.15
G22	-0.30	0.35	0.65	1.25	1.80	2.20	-1.25	-0.75	-0.30	0.40	0.85	1.30
G21	-0.60	0.00	0.40	1.05	1.60	2.00	-1.10	-0.65	-0.10	0.55	1.00	1.50
L21	-1.35	-0.70	-0.30	0.40	0.90	1.30	-0.55	-0.05	0.40	1.00	1.45	2.00
L22	-1.25	-0.60	-0.20	0.45	1.00	1.50	-0.10	0.30	0.85	1.45	1.90	2.30
T4	-1.35	-0.65	-0.30	0.35	1.00	1.40	0.00	0.40	0.95	1.50	2.00	2.35
T5	-1.40	-0.75	-0.35	0.30	0.95	1.35	-0.10	0.40	0.90	1.40	1.90	2.25
T6	-1.45	-0.75	-0.35	0.30	0.95	1.25	-0.10	0.35	0.80	1.40	1.90	2.25
T7	-1.45	-0.75	-0.35	0.25	0.90	1.30	-0.10	0.40	0.90	1.40	1.90	2.25
T8	-1.40	-0.70	-0.35	0.30	0.90	1.30	0.00	0.45	0.90	1.50	1.95	2.35
T9	-1.45	-0.75	-0.35	0.25	0.80	1.30	0.00	0.45	0.90	1.55	2.00	2.40
T10	-1.45	-0.80	-0.40	0.25	0.80	1.30	0.00	0.50	1.00	1.55	2.00	2.40
T16	-1.50	-0.80	-0.40	0.25	0.80	1.35	0.00	0.55	1.00	1.55	2.00	2.40
T11	-1.75	-1.00	-0.55	0.10	0.65	1.10	0.35	0.85	1.30	1.90	2.25	2.60
T12	-1.45	-0.80	-0.35	0.30	0.80	1.30	0.60	1.00	1.50	2.10	2.50	2.95
T13	-0.35	0.25	0.65	1.25	1.80	2.25	-1.05	-0.45	0.05	0.55	1.15	1.50

Table A16

Water-Surface Elevations for Plan 2A, Flow B

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.05	0.55	0.80	1.30	1.85	-1.10	-0.60	0.10	0.40	1.05
T2	0.10	0.55	0.85	1.35	2.00	-0.85	-0.30	0.30	0.60	1.30
T14	0.10	0.60	0.85	1.40	2.00	-0.80	-0.20	0.35	0.65	1.35
T15	0.10	0.60	0.85	1.35	2.00	-0.90	-0.30	0.35	0.60	1.35
T3	0.05	0.45	0.75	1.25	1.85	-0.95	-0.40	0.30	0.55	1.35
G22	0.00	0.45	0.65	1.20	1.80	-0.80	-0.25	0.40	0.65	1.20
G21	-0.10	0.35	0.60	1.10	1.75	-0.65	-0.15	0.50	0.80	1.45
L21	-0.60	-0.05	0.10	0.65	1.25	-0.35	0.35	0.85	1.15	1.70
L22	-0.50	-0.05	0.25	0.75	1.35	0.00	0.45	1.10	1.50	2.00
T4	-0.55	-0.10	0.15	0.70	1.35	0.00	0.50	1.15	1.40	2.05
T5	-0.55	-0.10	0.15	0.70	1.35	0.00	0.50	1.10	1.35	2.00
T6	-0.60	-0.15	0.10	0.65	1.25	-0.05	0.45	1.10	1.35	1.95
T7	-0.55	-0.10	0.15	0.65	1.25	-0.05	0.45	1.05	1.30	1.95
T8	-0.60	-0.15	0.15	0.65	1.30	0.00	0.50	1.10	1.35	2.00
T9	-0.65	-0.25	0.05	0.60	1.25	0.00	0.50	1.15	1.45	2.00
T10	-0.70	-0.25	0.00	0.55	1.20	0.00	0.50	1.15	1.45	2.00
T16	-0.70	-0.25	0.00	0.55	1.20	0.00	0.50	1.15	1.45	2.00
T11	-0.80	-0.35	-0.10	0.50	1.20	0.25	0.70	1.35	1.55	2.15
T12	-0.75	-0.15	0.00	0.60	1.30	0.40	0.90	1.50	1.85	2.30
T13	0.00	0.45	0.65	1.20	1.85	-0.70	-0.25	0.60	0.70	1.45

Table A17

Water-Surface Elevations for Plan 2A, Flow C

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.00	0.40	0.90	1.50	2.00	-0.75	-0.20	0.35	0.95	1.50
T2	0.05	0.45	0.95	1.55	2.05	-0.65	0.00	0.55	1.10	1.55
T14	0.10	0.50	0.95	1.55	2.05	-0.60	0.00	0.60	1.10	1.60
T15	0.00	0.50	0.95	1.55	2.05	-0.65	0.00	0.55	1.10	1.60
T3	-0.05	0.35	0.85	1.50	1.95	-0.65	-0.10	0.50	1.00	1.50
G22	-0.05	0.35	0.85	1.50	1.90	-0.60	0.00	0.55	1.15	1.60
G21	-0.10	0.30	0.75	1.45	1.90	-0.50	0.05	0.70	1.25	1.75
L21	-0.50	-0.10	0.45	1.00	1.55	-0.35	0.25	0.85	1.45	1.80
L22	-0.45	0.00	0.50	1.15	1.60	-0.05	0.50	1.10	1.60	2.05
T4	-0.45	-0.05	0.45	1.10	1.60	-0.05	0.50	1.10	1.55	2.05
T5	-0.45	-0.05	0.40	1.10	1.60	-0.05	0.50	1.10	1.55	2.05
T6	-0.55	-0.10	0.35	1.00	1.55	-0.05	0.45	1.10	1.55	2.00
T7	-0.55	-0.05	0.35	1.05	1.55	-0.05	0.45	1.05	1.55	2.00
T8	-0.50	-0.10	0.40	1.05	1.55	-0.05	0.50	1.10	1.55	2.00
T9	-0.55	-0.20	0.35	1.00	1.45	-0.05	0.50	1.10	1.55	2.05
T10	-0.55	-0.25	0.35	1.00	1.45	-0.05	0.50	1.10	1.55	2.05
T16	-0.55	-0.25	0.35	0.95	1.45	-0.05	0.50	1.10	1.55	2.05
T11	-0.60	-0.35	0.20	0.85	1.35	0.15	0.60	1.20	1.80	2.20
T12	-0.50	-0.20	0.30	1.00	1.45	0.20	0.80	1.30	1.90	2.30
T13	-0.05	0.35	0.85	1.45	1.95	-0.45	0.10	0.70	1.20	1.70

Table A18

Water-Surface Elevations for Plan 2A, Flow D

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	-0.05	0.55	0.80	1.45	1.85	-0.25	0.20	0.70	1.25	1.75
T2	0.00	0.55	0.85	1.50	1.90	-0.15	0.35	0.75	1.35	1.85
T14	0.00	0.60	0.90	1.50	1.95	-0.15	0.40	0.80	1.40	1.90
T15	0.00	0.55	0.85	1.50	1.90	-0.15	0.35	0.80	1.35	1.90
T3	-0.10	0.55	0.75	1.45	1.85	-0.20	0.30	0.75	1.35	1.80
G22	-0.15	0.50	0.75	1.40	1.85	-0.20	0.35	0.75	1.35	1.85
G21	-0.15	0.50	0.75	1.45	1.85	-0.05	0.45	0.85	1.40	1.95
L21	-0.45	0.20	0.40	1.15	1.55	-0.05	0.45	0.95	1.45	1.95
L22	-0.35	0.30	0.50	1.25	1.65	0.15	0.65	1.10	1.65	2.15
T4	-0.45	0.35	0.50	1.20	1.65	0.10	0.65	1.10	1.65	2.15
T5	-0.40	0.25	0.50	1.20	1.60	0.10	0.65	1.10	1.65	2.15
T6	-0.40	0.25	0.45	1.20	1.55	0.05	0.55	1.00	1.60	2.05
T7	-0.40	0.25	0.50	1.20	1.55	0.05	0.55	1.05	1.60	2.05
T8	-0.40	0.25	0.45	1.15	1.60	0.05	0.55	1.05	1.60	2.05
T9	-0.45	0.20	0.40	1.15	1.55	0.05	0.55	1.05	1.55	2.05
T10	-0.50	0.20	0.40	1.10	1.50	0.05	0.55	1.00	1.55	2.05
T16	-0.50	0.25	0.45	1.10	1.55	0.05	0.55	1.00	1.55	2.05
T11	-0.55	0.15	0.40	1.05	1.45	0.10	0.60	1.05	1.60	2.10
T12	-0.45	0.25	0.40	1.15	1.55	0.15	0.70	1.20	1.70	2.15
T13	-0.15	0.50	0.70	1.50	1.85	-0.10	0.45	0.85	1.45	1.90

Table A19

Water-Surface Elevations for Plan 2A, Flow E

Station	Water-Surface Elevations, ft msl									
	Flood					Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	-0.05	0.55	0.90	1.55	1.95	-0.10	0.55	0.85	1.40	1.85
T2	0.00	0.60	0.95	1.60	1.95	0.00	0.65	0.95	1.45	1.90
T14	0.00	0.60	0.95	1.60	1.95	0.00	0.65	0.95	1.45	1.90
T15	0.00	0.55	0.90	1.60	1.95	0.00	0.65	1.00	1.45	1.90
T3	-0.05	0.55	0.80	1.55	1.90	-0.05	0.65	0.90	1.45	1.85
G22	-0.10	0.50	0.85	1.55	1.90	-0.05	0.65	0.95	1.45	1.85
G21	-0.05	0.55	0.85	1.55	1.90	0.00	0.75	1.00	1.55	2.00
L21	-0.25	0.45	0.70	1.40	1.75	0.00	0.75	1.00	1.45	1.90
L22	-0.15	0.50	0.80	1.45	1.85	0.15	0.90	1.15	1.65	2.10
T4	-0.20	0.45	0.80	1.45	1.85	0.15	0.85	1.05	1.60	2.10
T5	-0.25	0.45	0.70	1.45	1.80	0.15	0.85	1.05	1.60	2.05
T6	-0.25	0.40	0.75	1.40	1.75	0.05	0.75	1.05	1.55	2.00
T7	-0.20	0.40	0.75	1.45	1.75	0.05	0.80	1.05	1.55	2.05
T8	-0.20	0.40	0.75	1.40	1.85	0.05	0.75	1.05	1.55	2.00
T9	-0.25	0.35	0.75	1.35	1.75	0.05	0.75	1.05	1.50	2.00
T10	-0.30	0.35	0.60	1.35	1.65	0.00	0.75	1.05	1.50	2.00
T16	-0.30	0.35	0.60	1.35	1.65	0.00	0.75	1.05	1.50	2.00
T11	-0.40	0.30	0.60	1.25	1.65	0.05	0.75	1.10	1.55	2.00
T12	-0.30	0.25	0.75	1.35	1.75	0.10	0.85	1.15	1.65	2.10
T13	-0.10	0.55	0.85	1.50	1.85	0.00	0.70	1.00	1.45	1.95

Table A20

Water-Surface Elevations for Plan 2B, Flow A

	Water-Surface Elevations, ft msl											
	Flood						Ebb					
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
T1	0.00	0.40	0.90	1.55	1.90	2.40	-1.35	-1.00	-0.35	0.30	0.75	1.25
T2	0.00	0.40	0.90	1.50	1.95	2.50	-1.15	-0.60	0.00	0.50	0.95	1.50
T14	-0.10	0.35	0.90	1.40	1.90	2.50	-1.10	-0.55	0.00	0.50	1.00	1.50
T15	-0.10	0.35	0.90	1.40	1.90	2.50	-1.20	-0.60	0.00	0.50	1.00	1.50
T3	-0.20	0.25	0.80	1.30	1.80	2.40	-1.20	-0.65	-0.05	0.40	0.90	1.40
G22	-0.25	0.20	0.70	1.20	1.75	2.30	-0.95	-0.45	0.15	0.65	1.10	1.60
G21	-0.55	-0.10	0.50	1.10	1.55	2.10	-0.90	-0.35	0.20	0.70	1.20	1.75
L21	-0.80	-0.40	0.10	0.65	1.25	1.75	-0.55	0.00	0.55	1.00	1.55	2.05
L22	-0.60	-0.30	0.30	0.80	1.30	1.90	-0.30	0.15	0.75	1.20	1.65	2.15
T4	-0.90	-0.55	0.10	0.60	1.10	1.70	-0.20	0.30	0.90	1.35	1.80	2.30
T5	-0.90	-0.40	0.10	0.70	1.20	1.80	-0.10	0.35	0.90	1.30	1.80	2.30
T6	-0.90	-0.40	0.10	0.70	1.20	1.80	-0.30	0.20	0.70	1.25	1.65	2.10
T7	-0.90	-0.50	0.10	0.70	1.10	1.80	-0.30	0.20	0.80	1.20	1.70	2.10
T8	-0.90	-0.40	0.10	0.70	1.20	1.80	-0.20	0.30	0.85	1.30	1.80	2.30
T9	-0.90	-0.45	0.05	0.60	1.20	1.80	-0.10	0.35	1.00	1.45	1.90	2.40
T10	-1.00	-0.55	0.00	0.60	1.10	1.70	0.00	0.50	1.05	1.55	2.05	2.50
T16	-1.00	-0.50	0.00	0.60	1.10	1.70	0.00	0.50	1.00	1.45	1.95	2.40
T11	-1.20	-0.70	-0.20	0.50	1.10	1.60	0.30	0.80	1.30	1.80	2.20	2.70
T12	-1.10	-0.60	-0.10	0.50	1.05	1.60	0.40	0.85	1.45	1.90	2.35	2.85
T13	-0.20	0.20	0.70	1.30	1.80	2.40	-0.85	-0.40	0.45	0.70	1.30	1.70

Table A21

Water-Surface Elevations for Plan 2B, Flow B

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.00	0.55	0.90	1.55	1.95	-0.80	-0.40	0.10	0.55	1.10
T2	-0.05	0.55	0.85	1.45	2.00	-0.70	-0.20	0.30	0.80	1.30
T14	-0.05	0.55	0.80	1.50	1.95	-0.70	-0.20	0.30	0.80	1.20
T15	-0.10	0.55	0.85	1.45	1.95	-0.70	-0.20	0.30	0.80	1.30
T3	-0.15	0.45	0.75	1.45	1.95	-0.80	-0.30	0.20	0.70	1.20
G22	-0.25	0.35	0.75	1.30	1.80	-0.55	-0.20	0.30	0.80	1.30
G21	-0.25	0.35	0.70	1.35	1.80	-0.50	-0.05	0.45	0.90	1.40
L21	-0.60	0.05	0.40	1.10	1.50	-0.30	0.15	0.60	1.10	1.60
L22	-0.55	0.15	0.45	1.10	1.60	-0.10	0.30	0.75	1.20	1.80
T4	-0.55	0.10	0.35	1.05	1.60	-0.05	0.40	0.90	1.30	1.80
T5	-0.60	0.05	0.40	1.00	1.50	-0.05	0.40	0.90	1.40	1.90
T6	-0.55	0.05	0.30	1.05	1.50	-0.15	0.30	0.75	1.25	1.75
T7	-0.55	0.05	0.40	1.05	1.50	-0.15	0.30	0.80	1.25	1.80
T8	-0.55	0.05	0.35	1.05	1.55	-0.10	0.35	0.80	1.30	1.75
T9	-0.60	0.05	0.30	1.05	1.45	0.00	0.40	0.90	1.40	1.90
T10	-0.65	0.05	0.30	1.00	1.50	0.05	0.50	1.00	1.45	1.95
T16	-0.65	0.05	0.25	1.05	1.55	0.05	0.50	1.00	1.45	1.95
T11	-0.75	0.00	0.25	0.95	1.45	0.30	0.70	1.15	1.60	2.10
T12	-0.70	0.00	0.25	0.95	1.45	0.35	0.75	1.20	1.65	2.15
T13	-0.20	0.40	0.80	1.35	1.85	-0.40	-0.05	0.45	0.95	1.40

Table A22

Water-Surface Elevations for Plan 2B, Flow C

Station	Water-Surface Elevations, ft msl									
	Flood					Ebb				
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.05	0.50	1.05	1.45	1.95	-0.65	-0.10	0.35	0.85	1.35
T2	0.00	0.45	1.00	1.45	1.95	-0.50	0.00	0.45	1.00	1.50
T14	0.00	0.50	1.05	1.45	1.95	-0.50	0.05	0.45	1.00	1.50
T15	-0.05	0.45	1.00	1.45	1.95	-0.55	0.00	0.50	1.05	1.50
T3	-0.10	0.40	0.95	1.40	1.85	-0.55	-0.05	0.40	1.00	1.45
G22	-0.20	0.30	0.85	1.25	1.80	-0.45	0.10	0.55	1.10	1.55
G21	-0.15	0.35	0.85	1.35	1.80	-0.30	0.15	0.60	1.15	1.65
L21	-0.45	0.10	0.65	1.15	1.60	-0.25	0.25	0.65	1.20	1.70
L22	-0.35	0.15	0.65	1.15	1.60	-0.20	0.30	0.80	1.30	1.75
T4	-0.35	0.15	0.65	1.15	1.60	-0.10	0.40	0.85	1.40	1.80
T5	-0.45	0.05	0.60	1.05	1.55	-0.05	0.40	0.85	1.40	1.90
T6	-0.45	0.05	0.60	1.10	1.55	-0.25	0.30	0.75	1.30	1.75
T7	-0.40	0.10	0.65	1.10	1.60	-0.15	0.30	0.80	1.30	1.80
T8	-0.45	0.05	0.60	1.05	1.55	-0.15	0.40	0.85	1.35	1.80
T9	-0.45	0.05	0.60	1.05	1.55	-0.05	0.45	0.90	1.45	1.90
T10	-0.45	0.05	0.60	1.05	1.55	0.00	0.50	0.95	1.50	1.95
T16	-0.45	0.05	0.65	1.10	1.60	0.00	0.50	0.95	1.50	1.90
T11	-0.55	0.00	0.55	1.00	1.55	0.15	0.60	1.00	1.55	2.00
T12	-0.55	0.05	0.55	1.00	1.50	0.05	0.55	0.95	1.50	2.00
T13	-0.10	0.35	0.90	1.35	1.85	-0.30	0.20	0.55	1.20	1.65

Table A23

Water-Surface Elevations for Plan 2B, Flow D

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	0.05	0.45	1.05	1.50	1.85	-0.45	0.15	0.50	1.20	1.55
T2	0.05	0.45	1.00	1.50	1.95	-0.30	0.30	0.70	1.25	1.70
T14	0.05	0.45	1.00	1.50	1.95	-0.40	0.20	0.65	1.25	1.80
T15	0.05	0.45	1.00	1.45	1.95	-0.35	0.25	0.60	1.30	1.65
T3	0.00	0.45	1.00	1.45	1.85	-0.40	0.20	0.60	1.25	1.60
G22	-0.05	0.40	0.95	1.45	2.05	-0.30	0.30	0.60	1.30	1.70
G21	-0.05	0.35	0.90	1.45	1.90	-0.20	0.30	0.70	1.40	1.75
L21	-0.15	0.25	0.75	1.25	1.70	-0.20	0.35	0.75	1.40	1.80
L22	-0.15	0.25	0.80	1.30	1.70	-0.20	0.35	0.80	1.40	1.80
T4	-0.15	0.25	0.80	1.35	1.70	-0.20	0.40	0.80	1.40	1.80
T5	-0.25	0.20	0.75	1.25	1.80	-0.10	0.50	0.90	1.50	1.90
T6	-0.25	0.20	0.75	1.25	1.60	-0.25	0.30	0.75	1.40	1.75
T7	-0.20	0.20	0.75	1.30	1.65	-0.20	0.35	0.80	1.40	1.80
T8	-0.20	0.20	0.75	1.25	1.65	-0.20	0.35	0.80	1.40	1.80
T9	-0.25	0.25	0.75	1.30	1.60	-0.10	0.40	0.85	1.50	1.85
T10	-0.25	0.20	0.75	1.25	1.65	-0.10	0.50	0.90	1.50	1.90
T16	-0.25	0.20	0.75	1.25	1.65	-0.05	0.45	0.90	1.50	1.90
T11	-0.30	0.15	0.75	1.25	1.60	0.00	0.50	0.90	1.50	1.90
T12	-0.25	0.15	0.70	1.20	1.60	-0.15	0.50	0.80	1.45	1.85
T13	-0.05	0.40	0.95	1.45	1.80	-0.25	0.35	0.75	1.40	1.70

Table A24

Water-Surface Elevations for Plan 2B, Flow E

	Water-Surface Elevations, ft msl									
	Flood					Ebb				
Station	Run 1	Run 2	Run 3	Run 4	Run 5	Run 1	Run 2	Run 3	Run 4	Run 5
T1	-0.20	0.45	0.95	1.35	1.85	-0.20	0.50	0.80	1.30	1.75
T2	-0.15	0.50	1.00	1.40	1.90	-0.15	0.55	0.90	1.35	1.75
T14	-0.15	0.50	1.00	1.40	1.90	-0.20	0.55	0.90	1.35	1.75
T15	-0.15	0.55	1.00	1.40	1.90	-0.10	0.55	0.90	1.35	1.75
T3	-0.25	0.40	0.85	1.25	1.85	-0.20	0.50	0.90	1.30	1.75
G22	-0.10	0.55	1.00	1.50	1.90	-0.15	0.50	0.90	1.40	1.75
G21	-0.10	0.55	0.95	1.40	1.90	-0.10	0.60	0.90	1.40	1.80
L21	-0.25	0.40	0.80	1.25	1.80	-0.05	0.60	1.00	1.45	1.85
L22	-0.30	0.45	0.80	1.25	1.80	0.00	0.60	1.00	1.40	1.90
T4	-0.30	0.35	0.80	1.25	1.80	0.00	0.60	1.00	1.40	1.90
T5	-0.10	0.50	0.90	1.35	1.90	0.00	0.60	1.00	1.45	1.90
T6	-0.35	0.35	0.80	1.20	1.75	-0.05	0.60	1.00	1.40	1.80
T7	-0.35	0.35	0.80	1.20	1.75	0.00	0.60	1.00	1.40	1.85
T8	-0.35	0.35	0.80	1.20	1.70	0.00	0.75	1.10	1.50	1.85
T9	-0.40	0.30	0.75	1.20	1.70	0.00	0.65	1.05	1.50	1.90
T10	-0.30	0.35	0.80	1.20	1.75	0.00	0.70	1.05	1.50	1.90
T16	-0.25	0.35	0.80	1.20	1.75	0.00	0.70	1.05	1.50	1.90
T11	-0.35	0.35	0.80	1.20	1.70	0.00	0.70	1.05	1.50	1.90
T12	-0.35	0.30	0.80	1.15	1.70	0.15	0.60	1.00	1.40	1.80
T13	-0.25	0.45	0.90	1.30	1.85	-0.10	0.60	1.00	1.40	1.85

In accordance with ER 70-2-3, paragraph 6c(1)(b), dated 15 February 1973, a facsimile catalog card in Library of Congress format is reproduced below.

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